SEPTEMBER 13, 1954

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

PRODUCT DIVERSIFICATION

Five Roads to Greater Profit . . .

New products replace "losers," find work for idle facilities, balance out cycles, provide outlets for proprietary items, insure growth, p. 113

A PROGRAM FOR MANAGEMENT IN 1954

No. 8 in 1954 Management Series

CONTENTS — PAGE 5

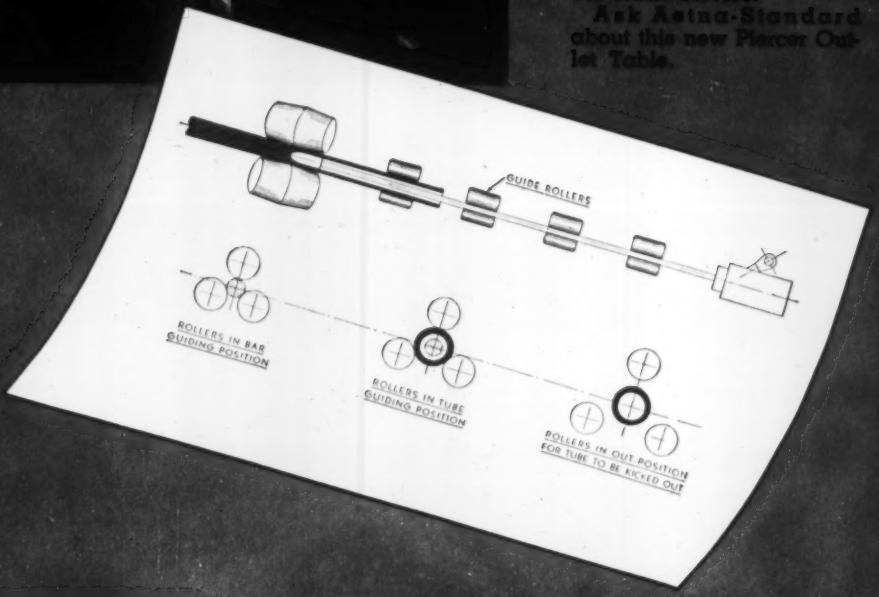
New Piercer Outlet Table

improves concentricity of tubes

The same rollers guide both piercer bar and tube, assuring three advantages: (1) positive guiding of bar; (2) improved outside tube surface; (3) more uniform concentricity from end to end of tube.

On the operating side, the setting for different rolling schedules (changes in bar or tube diameter) requires only a few minutes . . . without crane service.

Ask Aetna-Standard about this new Piercer Outlet Table.


GUIDE ROLLERS
ROLLERS IN BAR GUIDING POSITION
ROLLERS IN TUBE GUIDING POSITION
ROLLERS IN OUT-POSITION FOR TUBE TO BE KICKED OUT

features

1. Same rollers guide piercer bar and tube (see diagram).
2. Guide rollers open automatically from bar guiding to tube guiding position as pierced tube leaves piercing mill.
3. Indicators allow quick setting of guide rollers to suit respective mandrel bar and O. D. tube sizes.
4. Roller guides are adjustable for full range of piercing mill from minimum diameter bar to maximum O. D. tube.
5. Simple, rugged design.

THE AETNA-STANDARD ENGINEERING COMPANY • PITTSBURGH, PA.

Aetna-Standard

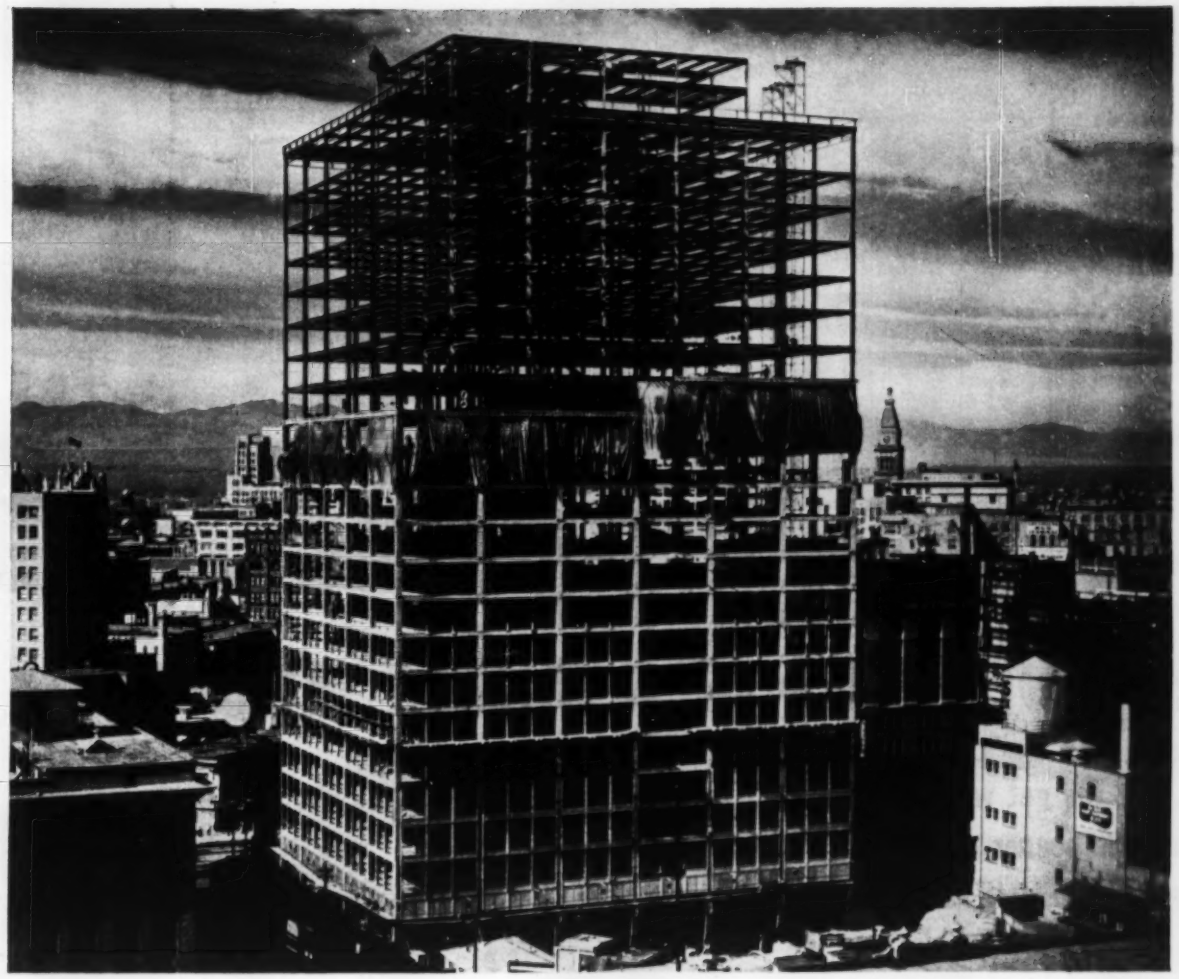
PLANTS IN WARREN, OHIO • ELLWOOD CITY, PENNSYLVANIA

GOOD EQUIPMENT BRINGS DOWN PRODUCTION COSTS

SUBSIDIARY and ASSOCIATED COMPANIES

Head Wrightson Machine Company, Ltd., Middlesbrough, England—Great Britain, Finland, Sweden, Norway, Denmark, Union of South Africa, Northern and Southern Rhodesia.
Aetna-Standard Engineering Company, Ltd., Toronto, Ontario, Canada.
M. Castellvi, Inc., New York, N. Y.—Mexico, Central and South America.
Societe de Constructions de Blanchard, Paris, France—France, Belgium, Holland, Luxembourg, Switzerland.
Demag Aktiengesellschaft, Duisburg, Germany—Germany, Austria, Yugoslavia, Greece, Turkey, Egypt.
Compagnie Italiana Forme Aperte, Milano, Italy—Italy.
Aetna-Japan Company, Ltd., Tokyo, Japan—Japan.
Mein & Kullgren, Inc., Akron, Ohio—Representative for the Rubber Industry.
Standard Engineering Company, Ellwood City, Pa.
Trans-World Traders, Pittsburgh, Pa.

Designers and Builders to the Ferrous, Non-Ferrous, Leather, Rubber, and Plastic Industries



Bethlehem High-Strength Bolts were used in erecting this 23-story office building, principal structure of Denver's Mile High Center. With bolting keeping pace with erection crews, the 4600-ton steelwork was completed in 82 working days.

Steel erection moves fast with High-Strength Bolts

Steel erection moves rapidly and smoothly when Bethlehem High-Strength Bolts are used to join the structural members.

Bethlehem High-Strength Bolts save time and promote economy because they can be installed quickly by two men, one using a holding wrench, the other a pneumatic impact wrench. The hexagonal-head bolts are inserted with two hardened washers, one of which is placed under the head, the other under the hexagonal nut. When properly torqued, the bolts remain tight indefinitely.

Bethlehem High-Strength Bolts are furnished in carbon steel in all sizes from ½ in. to 1¼ in., and in varying lengths. Heat-treated by quenching and tempering, they fully meet the requirements of ASTM Specification A-325.

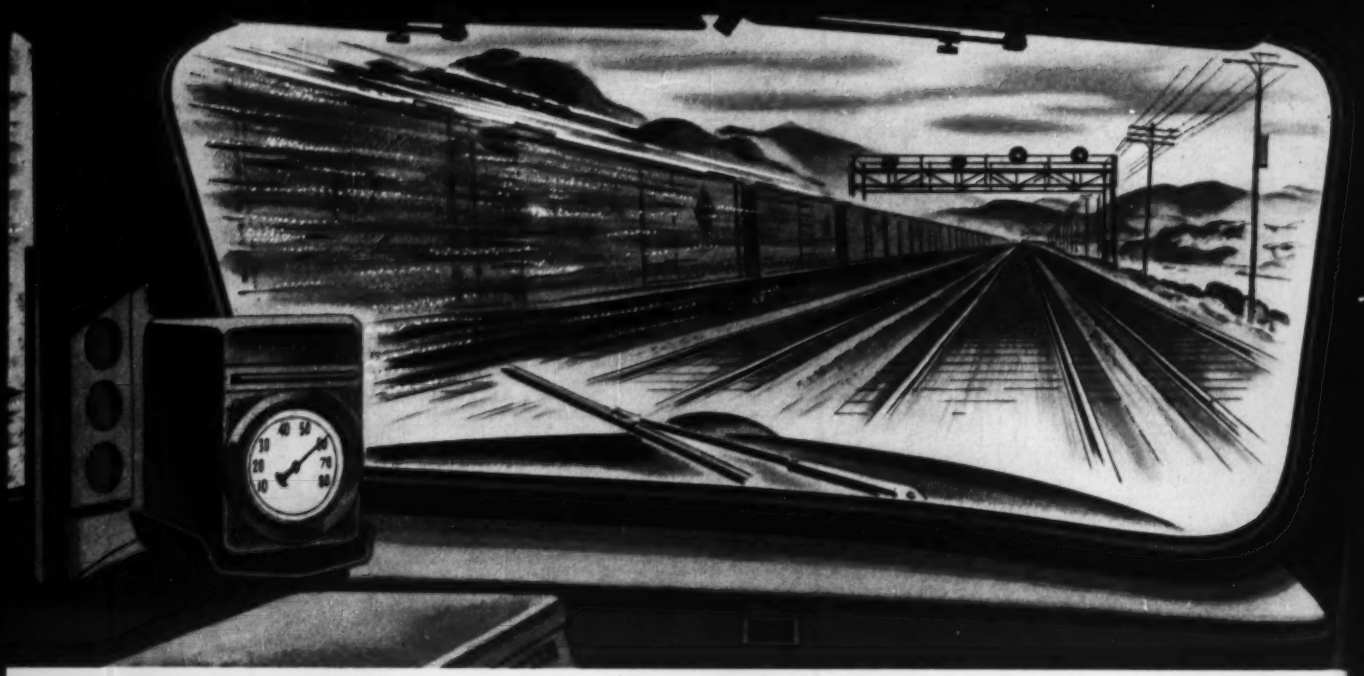
Additional information about Bethlehem High-Strength Bolts is yours for the asking. Simply get in touch with the Bethlehem sales office nearest you.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

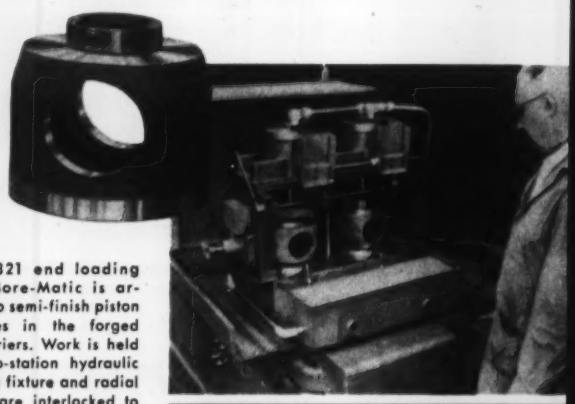
Bethlehem Bolts Are Good Bolts

BETHLEHEM STEEL



10,000 TONS AT A MILE A MINUTE!

...it will get where it's going a little sooner, a little safer, because this part got the FULL HEALD TREATMENT



You're hitting the high iron at 60 per, with ten thousand tons of fast freight behind you. The huge, smoothly-purring diesels at your command have ample power and stamina to pull this tremendous load for hundreds of miles—with no interruptions, no unscheduled stops.

The tremendous power and long-haul dependability of modern diesel locomotives are a tribute to the skill and ingenuity of their makers. And precision finishing on Heald machines adds much to the stamina and perfect functioning of many vital diesel parts. Here, for example, is a piston pin carrier that is processed on *all three* basic Heald machines—as shown at the right.

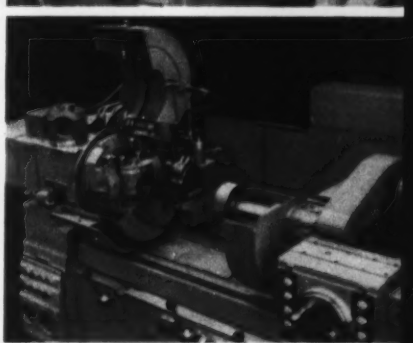
Whenever a part is precision finished on Heald equipment you can be sure of three things. A finer, longer-lasting, precision made part. Important savings in time and production cost. A definite competitive advantage for your product. That's why IT PAYS TO COME TO HEALD.

THE HEALD MACHINE COMPANY

WORCESTER 6, MASSACHUSETTS

Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York

Model 321 end loading Heald Bore-Matic is arranged to semi-finish piston pin holes in the forged steel carriers. Work is held in a two-station hydraulic clamping fixture and radial locaters are interlocked to insure proper location before machine is started.



Model 272 Gage-Matic Internal finish grinds the piston carriers. The work is held in an angle plate fixture with hand clamping; location is by pins in locating holes in piston carrier skirt. Workhead spindle positioning units are furnished so that loading will be from one position at all times.

Model 261 Rotary Surface Grinder finishes the shoulder of the piston pin carrier to provide flat smooth surface for locating on the inside dome of the diesel piston. The work is held on a radial pole magnetic chuck with a retainer ring. Machine operates on a standard operating cycle.

OSBORN

From 50 minutes to 6. Burr removal and finishing of rack gears was formerly a 50-minute job by hand. Now, with the machine shown and Osborn Fascut® Brushes, the job takes only 6 minutes. Smoothness and uniformity are far superior.

8 times as fast!

What could this study do for you?

THE burr-removal and finishing job shown above formerly took 50 minutes. Now, with Osborn Power Brushing, it takes only 6 minutes and the product is far superior. Helping to get results like this is the big objective of Osborn Brushing Specialists when they make an **O**sborn **B**rushing **A**nalysis.

It will pay *you* to have an **OBA** made of your production cleaning and finishing operations to find out definitely where the latest power brushing techniques can improve quality and cut your costs. Call or write *The Osborn Manufacturing Company, Dept. G-23, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

How he works. In making an **OBA**, your nearby Osborn Brushing Specialist studies your production with an eye to improving cleaning and finishing operations with power brushing. He gives you a written report with recommendations. His extensive experience is backed up by the facilities of the Osborn Technical Department.

Osborn Brushing Analysis

TO HELP YOU DISCOVER HIGHER QUALITY AND LOWER COSTS WITH POWER BRUSHING

Where PERFORMANCE

...and PRICE Meet!

Modern tool and cutter grinding demands top performance *and* economy.

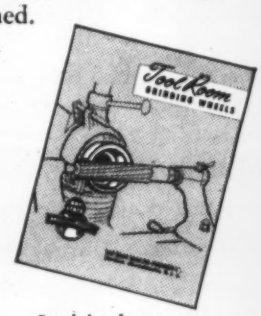
BAY STATE'S new "8A" vitrified Bonded Wheels meet both these requirements.

FIRST
"8A" is a combination of specially selected and blended abrasives.

Result: Wheel cost is considerably lower, yet the all-important cutting characteristics of premium priced wheels are matched.

SECOND
The cutting action is fast, free, and cool . . . giving long useful life with minimum dressing.

This is one more illustration of "better grinding" engineered by BAY STATE in its outstanding "Wheels of Progress" program.



Send for latest brochure giving tool grinding specifications.

BAY STATE
WHEELS of PROGRESS

BAY STATE ABRASIVE PRODUCTS CO., Westboro, Mass., U. S. A.
Branch Offices and Warehouses — Chicago, Cleveland, Detroit, Pittsburgh
Distributors — All principal cities
In Canada: Bay State Abrasive Products Co. (Canada) Ltd., Brantford, Ont.

Manufacturers of all types of Quality Abrasive Products

This Week in Metalworking

STEEL

Vol. 135 No. 11 September 13, 1954

√ NEWS √ PRODUCTION-ENGINEERING √ MARKETS

Metalworking Outlook 65

As the Editor Views the News 69

Tackling Taconite 76
Reserve Mining Co. prepares its play

Windows of Washington 80

Saugus: America's First Ironworks 85
Restoration marks shrine to all American industry

Mirrors of Motordom 87

The Business Trend 91

Men of Industry 95

Technical Outlook 123

Vapor Degreasing Earns Its' Keep 124
Advantages many. You can evaluate cleaning requirements to see if process has place in your operation

Manganese-Copper Alloys Put Damper on Noise 127
High-damping alloys have aided in fight against detrimental effects of plant noises on people and production

Versatile Tool for Metal Fabricators 128
Belt swing frame grinders are being used to tackle variety of jobs. A few applications are described

Progress In Steelmaking 132
Rotaflame Burners Heat Rectangular Furnace—Whirling flame keeps temperature constant, no soft spots on rolls

They Said This Was Impossible 136
Rectangular hole in ⅝-inch thick 4130 chrome-moly steel being punched. Shaving finishes. Here's how it's done

New Products and Equipment 159

The Market Outlook 175
Metal Prices and Composites begin on Page 176

Nonferrous Metals 178

Behind the Scenes	6	Foreign News	83
Letters to the Editors	10	Obituaries	98
Calendar of Meetings	27	Helpful Literature	168

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By 'quick delivery' we mean shipment the same day your order is received. Delivery on 'special orders' is made a week or two sooner than you would normally expect.

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- Work-hardens to 500 Brinell.
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behind the scenes

Death of a Salesman?

We don't know offhand what percent of total American business is directly credited to salesmen, but we assume it is more than considerable. True, some of the better mousetrap people can lay back and burp gently while the world beats a path to their door, but that business is an exception. It is generally accepted that business is brought in by salesmen, and as a result salesmen rate wide respect. Wherefore we were startled to come across a poll of 13,513 salsmen's wives, made over a two-year period by the Research Institute of America, wherein it was made manifest that the ladies weren't impressed at all by the importance of the salesman.

The wives complain about long separations, being left without a car, sales conferences that are "more than just cocktail parties", social functions that "include secretaries, but not wives", the uncertainty of income from commissions. Generally, however, they credit salesmanship with paying the most money and giving the highest rewards in accordance with ability and efforts. One lady urged the elimination of "intelligence - insulting sales pep talks", while another had a quick solution: "fire three fourths of all the bosses and start over."

Top Brass Honors Old Iron

On page 85 you will find a story concerning the restoration of America's first successful ironworks, built at Saugus, Massachusetts, about 1646. In the memory of man 300 years is a long time, but in the scheme of things it is no more than a day that is spent, or a watch in the night. What was going on in 1646? Surely, there was very little industrial activity in America. The idea of the little ironworks turning out ox shoes, hooks, knives and pots while contemporary workers in the vineyards of the Lord were roasting witches intrigued industrial leaders. Men who played a great part in the restoration were Edward L. Ryerson, Chairman of the Executive Committee, Inland Steel Co.; Walter S. Tower, former President, American Iron & Steel Institute; J. Sanger Attwill, President of the First Iron Works Association, and Quincy Bent, former Vice President, Bethlehem Steel Company.

How did they make iron at Saugus three centuries ago? How did the Indians react? Where was Miles Standish? John Alden? Mike Garcia? (Correction: Mike Garcia was another Indian who descended upon Massachusetts only last week.)

Steel Show Issue: Solid, Son!

This reminds us that a World Series may occur in Cleveland just in time to divert members and guests of the 1954 AISE Convention and Iron & Steel Exposition scheduled for September 28, 29, 30 and October 1 at the Cleveland Public Auditorium. Al Rosen, Jim Lemon, Roberto Avila & Co. will have much to offer the 500 visiting engineers, but the entire American and National Leagues couldn't begin to match the Steel Show Issue of STEEL (to be published Sept. 20) in the matter of informing and instructing the metalworking industry.

As usual, STEEL will carry the Steel Show Program, technical papers, list of exhibitors with booth numbers, etc. Since STEEL's special issue will appear one week earlier, it is certain to be snapped up. Keep your copy locked in your tackle-box, or slyly write for extra copies.

Steel capacity now is 124.3 million tons a year. That's an increase of 50 per cent since 1940. Chairman E. T. Weir of National Steel says this capacity will have to be replaced entirely within 30 years at an average annual cost of $1 billion a year. And there's the problem of adding capacity in the next few years to match population growth.

Chairman Ben Fairless of U. S. Steel says it will take 14 more plants such as the 1.8-million ton Fairless Works to meet the demands of 45 million new people in the next 20 years . . . even if per capita consumption remains what it is today.

There's going to be a lot of business. Will you get your share?

Shrdlu

(Metalworking Outlook—Page 66)

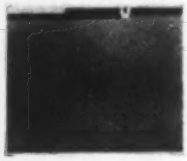
Remington Rand (Advertisement)

BETTER BUSINESS METHODS

For Greater Profits Through Lower Costs

Efficient and Inexpensive Purchase Order Follow-Up Clicks at Libby-Owens-Ford

This Company processes open purchase orders with a minimum of confusion, executive time and expense, by using signalled Visible Tip Follow-Up Folders with printed date scales. All orders are followed up automatically by clerks on signalled



dates. Folders are filed by vendor's name for easy reference, yet the visible signals make follow-up easy. Kardlok signals lock into position for positive control, yet can be changed easily. The same folders are used hundreds of times and the same clerk handles a given order for its entire "open" life. This system covers any application where follow-up is essential. See LBV567 Rev. 1.

Sound Maintenance Plan Slashes Costs; Assures Equipment Productivity

Folder X1383 Rev. 1 describes graphically a Maintenance Control System that is currently cutting maintenance costs while boosting equipment productivity in many well known plants. This Plan fulfills

the five *must* requirements of any workable maintenance control system, including *written work orders, scheduled work, equipment records, stores control* and *executive reports.* Read about it in X1383 Rev. 1.

Effective Machine Loading System for Maximum Return on each Production Dollar

A good machine loading system should accomplish these objectives: (1) Indicate available machine capacities for handling any new work. (2) Point up bottlenecks and lags. (3) Assure proper sequence of job handling to meet schedules. (4) Control work flow, to process each unit in the shortest possible time, thus keeping work-in-process inventory at a minimum. (5) Control production by measuring performance against an established plan, resulting in better customer service and lower costs.

Remington Rand's Machine Loading System meets these basic needs the fastest possible way . . . *visibly.* At a glance, Sched-U-Graph visible charting tells you the load ahead of each machine, work station or machine center . . . the jobs that constitute that load . . . all scheduled starting and completion dates . . . how much free machine time is available and when it is available. It's all explained fully in our new folder. Your free copy may easily lead to improving your plant's "Production per Dollar" ratio. Just circle KD738 on the coupon.

New Printing Calculator is Fully Automatic

For figuring costs, prorating overhead, and for many other figurework chores, plant after plant is turning to the new, fully automatic Model 99 *Printing* Calculator. This "2-in-1" figuring phenomenon features automatic division and multiplication, plus 10-key touch addition and subtraction, with all proof printed on Simpla-tape in black and standout red. Printed tape proof and 10-key touch method operation assure greater, more accurate output. Get all the facts on this newest step in figurework progress from folder C669, offered in the coupon.

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Yes, I'd like to have the literature circled.

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X1383 Rev. 1 C669

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1-19

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"STRAIGHT-EDGE" CUTTING ACCURACY
Positive, power actuation grips work securely for maximum cutting accuracy.

LOW IMPACT AVERTS DAMAGE AND INACCURACY
Individual pressure feet contact work with low impact, thus safeguarding both the material and bed against damage, as well as reducing noise level. No hammer-blows to mar work. No peening of bed with resulting distortion of knife seat.

SIMPLIFIED, LOW UPKEEP DESIGN
Simplicity of design and construction, involving a minimum number of parts, assures negligible servicing. With *less* to go wrong, there is *less* to repair and replace.

HOLDS WORK FLAT AND STATIONARY
Multiple pressure feet on 6" centers, applying uniform pressure, hold work flat and tight against bed to assure utmost shearing accuracy. No rippling of sheet between feet as cut progresses. Firm grip on short pieces.

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Individual feet are self-compensating, requiring no adjustment for cutting stock of different thicknesses . . . *even at the same time.*

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In a power squaring shear, no *single* feature nor component can be fully responsible for accuracy, speed and economy. *They* result from a *combination* of features such as the self-compensating holddown; rigid, fully closed box section construction of bed and crosshead; low slope of upper knife; ample and accurately held crosshead guides; multiple point sleeve clutch — the very features that have established the marked superiority of Niagara's Underdrive Series.

For the whole story, straightforwardly presented, on America's most complete line of underdrive power squaring shears, with capacities from shim stock to 1 in. thick mild steel (lengths 3 to 20 ft.), request *Niagara Bulletin 69.* Write today.

NIAGARA

UNDERDRIVE SQUARING SHEARS

Forming the above Special Pan Head Bolt in two blows presented a difficult cold heading problem that was solved by the use of Keystone "Special Processed" Cold Heading Wire.

The superior grain flow characteristics of "Special Processed" Wire provided the necessary upsetting and die forming qualities to withstand the terrific displacement of metal during the two blow process. The head was formed without buckling, distortion or cracking — longer die life, increased production, and a higher quality finished product resulted.

Carefully selected ingredients — our own exclusive drawing and heat treating process — rigid quality controls and inspections — give this wire unsurpassed performance on any unusually difficult cold heading job. Your inquiry is welcomed.

LETTERS
TO THE EDITORS

Time for Two

I would like to have the complete addresses for two organizations which I have seen mentioned in STEEL: New England Steel Development Corp. and Pacific Steel Rolling Mills Inc.

G. W. MacRitchie
238 San Jacinto
Lone Star, Tex.

• *The address of Pacific Steel Rolling Mills Inc. is 1750 Fourth Ave. S., Seattle 4. As you know, Pacific is a new firm that began production this year. New England Steel Development Corp. is a nonoperating organization, originally formed by the New England Council to investigate the possibility of an integrated steel plant in the New England states. Its address is Statler Building, Park Square, Boston 16.—ED.*

For a Closer Look

We are interested in obtaining further information concerning investment casting as described in your article, "Take a Closer Look at Investment Casting" (Aug. 23, p. 104). We would like to get the address for the Investment Casting Institute.

R. E. Young
purchasing agent
Capital City Mfg. Co.
Columbus, O.

• *That's Investment Casting Institute, 27 East Monroe St., Chicago 3.—ED.*

Added Line on Adhesives

In connection with your very interesting article, "Adhesives Join the Assembly Line" (July 26, p. 88), we call your attention to a bibliography issued by the Office of Technical Services on adhesives. This bibliography sells at 25 cents a copy and is available from Commerce department field offices.

George A. Moore
manager
Bureau of Foreign & Domestic Commerce
Commerce department
Cleveland

Traffic Managers' Story

Congratulations on the excellent presentation of "Transportation in Distribution" Number 7 in STEEL's 1954 Program for Management. This article goes a long way toward helping today's industrial traffic manager publicize the fact that proper traffic management is not just a detail that can be handled by almost anybody in sales, production or purchasing.

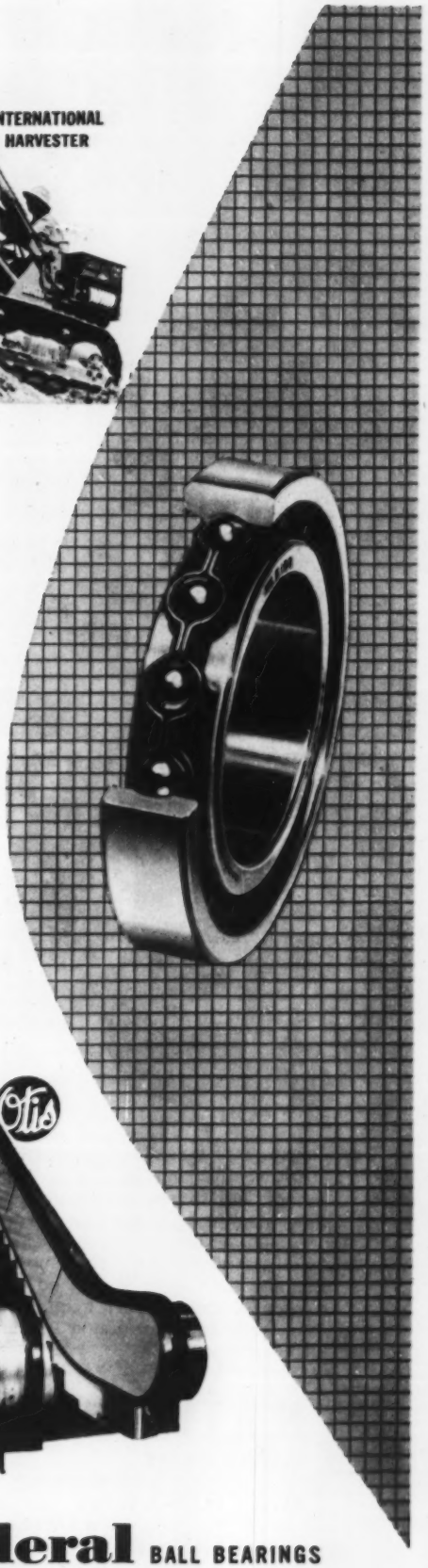
Your article is very thorough and accurate and the information is factually correct with the exception of one point: The chart on p. 90, entitled "What a Traffic Manager Does—The Primary Jobs in Order of Importance," was shown in the Indiana State Chamber of Commerce report to indicate the functions which are performed by most traffic departments. The different functions are listed according to the number of

(Please turn to page 12)

down on the farm-

INTERNATIONAL HARVESTER

Rocks and bumps—exposure to all kinds of weather—they're part of the everyday job of International tractors and earth-moving equipment—and part of the everyday jobs of Federal Ball Bearings to keep them rolling.



so much of industry *turns* on FEDERAL ball bearings

Tractors and escalators—cars and planes—if people and things are moving—Federal Ball Bearings keep them moving. In your home, office or factory, you'd probably find some of the hundreds of bearing types that this 50-year-old company is now making in over 12,000 sizes.

When Federal Ball Bearings are a part of so many things you *use*, shouldn't they be a part of the things you *make?*

THE FEDERAL BEARINGS CO., INC. • POUGHKEEPSIE, N. Y.

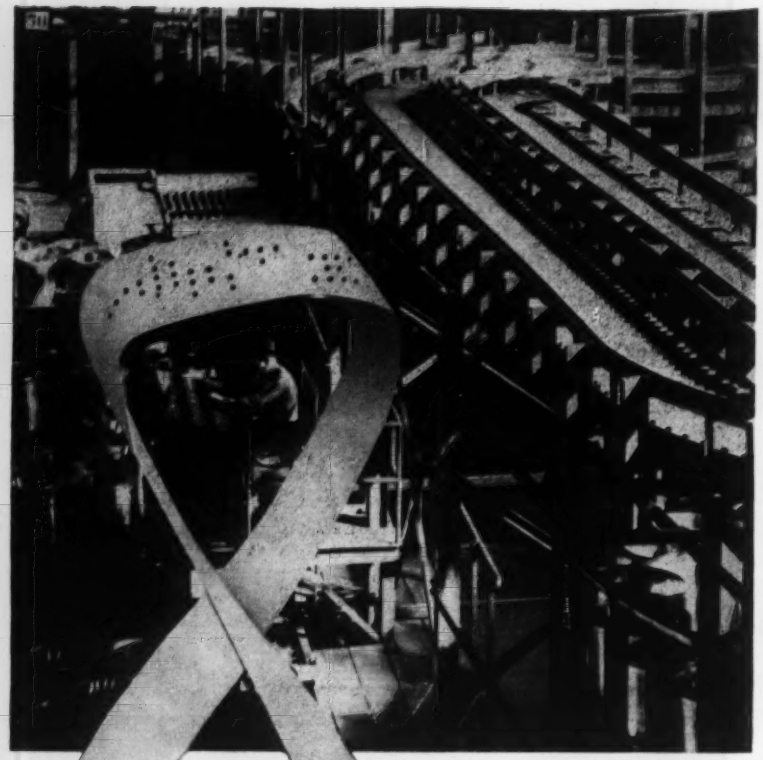
or up an escalator-

Getting thousands of workers in and out of subways, bus terminals and skyscrapers puts repeated, concentrated loads on Otis escalators and elevators. Federal Ball Bearings help take the ups and downs in quiet stride.

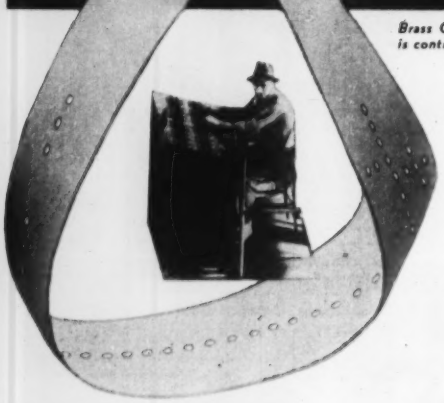
Have a look at the 256 pages of ball bearing information in Federal's catalog. Just drop us a line and we'll send you your copy.

Federal BALL BEARINGS

One of America's Largest Ball Bearing Manufacturers



Brass Coil Storage Conveyers. Flow of materials is controlled by the one operator at pulpit.



how Mathews Conveyer Systems have been helping to make *Automation* a reality

● Mathews Conveyers, equipped with such control devices as electric eye mechanisms, traffic control units, special brakes and stops, and automatic deflectors, have for several years been helping manufacturers to progress toward automation by handling materials to processing machines and away with a minimum of manual effort. In almost every industry, in plants throughout the United States and Canada, you'll find Mathews Conveyer Systems at work helping to make AUTOMATION a reality. Write for informtaion to the Mathews Field Office or Plant nearest you.

MATHEWS CONVEYERS

GENERAL OFFICES . . . . . *Mathews Conveyer Company*
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PACIFIC COAST DIVISION . . . *Mathews Conveyer Company West Coast*
SAN CARLOS, CALIFORNIA

CANADIAN DIVISION . . . . . *Mathews Conveyer Company, Ltd.*
PORT HOPE, ONTARIO

ENGINEERING OFFICES OR SALES AGENCIES IN PRINCIPAL AMERICAN AND CANADIAN CITIES

LETTERS

(Concluded from page 10)

traffic departments performing that function; not in order of importance.

A traffic manager who spends his day checking tariffs and tracing shipments should not be considered a professional traffic manager. As Chester Thompson, president, American Waterways Inc., recently said: "Large industries are falling into line with the conviction that the top traffic job is administrative rather than functional."

Lest your readers fall into the common error of generalizing about a complicated subject, we believe it should be mentioned that picking a carrier is not as simple as determining the mileage and degree of speed required for the transportation of a shipment. Rates vary greatly because they are published by 14 railroad and 84 motor carrier tariff-publishing agencies. Oddly enough, on some short haul shipments, railroad service may be cheaper than truck and just as fast. In other parts of the country, motor carrier service is faster and cheaper than railroad service for hauls as long as 1700 miles.

You deserve a vote of thanks from the industrial traffic management field. Please send us two reprints of the article.

James W. Lee
traffic manager
Kansas City Division
Bendix Aviation Corp.
Kansas City, Mo.

● *Thanks for your comments and you're right, we would have been more accurate if we had labeled the jobs as being in the order that they were most commonly performed by traffic departments.—ED.*

Distribution Topics

"Transportation in Distribution," Number 7 in STEEL's 1954 Program for Management (Aug. 23, p. 89), has been called to my attention. As a continuing student of transportation economics, may I congratulate you on the conciseness and general excellence of this article on the role of the traffic manager in modern industry. The presentation is the best that I have ever read on the subject.

Theodore F. Kohn
7314 Hamilton Ave.
Pittsburgh

We would like a copy of "Personnel in Distribution," Number 6 in STEEL's 1954 Program for Management (July 19, p. 91) . . .

D. Fred Blackwell
executive vice president
Wholesale Dry Goods Institute Inc.
New York

You published a very fine article in your June 21 issue, "Integrate Your Distribution," Number 5 in STEEL's 1954 Program for Management. I am wondering if it is possible to get six sets of tear sheets of this article. I can imagine you have had many requests for copies of this article since it is so well done.

C. C. Shenkle
general manager
Rockwell Meters Inc.
Uniontown, Pa.

OHIO FORGE AND MACHINE

OHIO F&M CO

eliminates two grinding operations

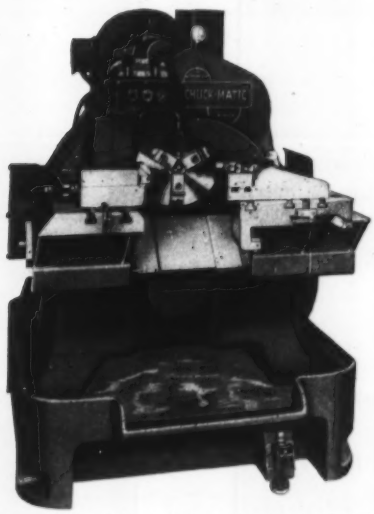
machining high precision diesel engine gear blanks

Machined on **CHUCK-MATIC** from A-4340 steel forging annealed.

1st operation: (on front side) Face hub and flange, form radius on O.D., bore and chamfer hole, turn O.D. partway.

2nd operation: (on other side) Face, finish bore and turn O.D. remainder.

ON ACME-GRIDLEY CHUCK-MATICS



Acme-Gridley 12" Single Spindle CHUCK-MATIC is radically different from any other machine heretofore offered for short length primary operations such as forming, turning, drilling, straight or taper boring, facing, etc.

By switching these jobs to Chuck-Matics, Ohio Forge and Machine Corporation in Cleveland, Ohio, now machine tough forged blanks concentric within .0002"—hold tolerances which eliminate the green (or soft) grinds previously required on bore and O.D. before the teeth could be cut.

And they save, too, with automatic control of cycle time—a predetermined machining rate that you can count on for every piece.

This Radically Different Chucker

is built for high speed precision work on heavy duty jobs. Check these features against your present methods—

- **automatic control of machine time cycle**
- **easy to set up and retool**
- **does not require skilled labor—one man operates as many machines as cycle times of jobs permit**
- **is space saving—only 45" wide, 64" long**
- **precision work at speeds and feeds as fast as carbide tools can take it.**

—then write for catalog SC-46. Or, better still, ask us to talk it over.

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The NATIONAL ACME COMPANY

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The OXWELD Automatic Tracer is an accurate, economical motive power unit for oxygen-cutting machines. It is easy to set up and operate. No special tools are needed for templet cutting—they can be cut from VINYLITE plastic sheets with a knife or shears.

With an OXWELD Automatic Tracer

Trade-Mark

MAKES OXYGEN-CUTTING FAST, EASY and ACCURATE

Fast, clean, and accurate—that's how parts produced by automatic tracer-guided cutting machines come off the production line . . . Whether the job is cutting a wide range of simple patterns or intricate shapes, hundreds at a time or one piece—the OXWELD Automatic Tracer reproduces all templet designs exactly, and economically.

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Simple to set up—no special tools are required for making templets, they can be cut from VINYLITE plastic sheets with a knife or shears . . . The templet is simply mounted on the tracing table with masking tape. Your LINDE representative will be glad to discuss your needs, and help you determine the best setups for your oxygen-cutting operations. Start saving now—call him today for more information.

LINDE AIR PRODUCTS COMPANY
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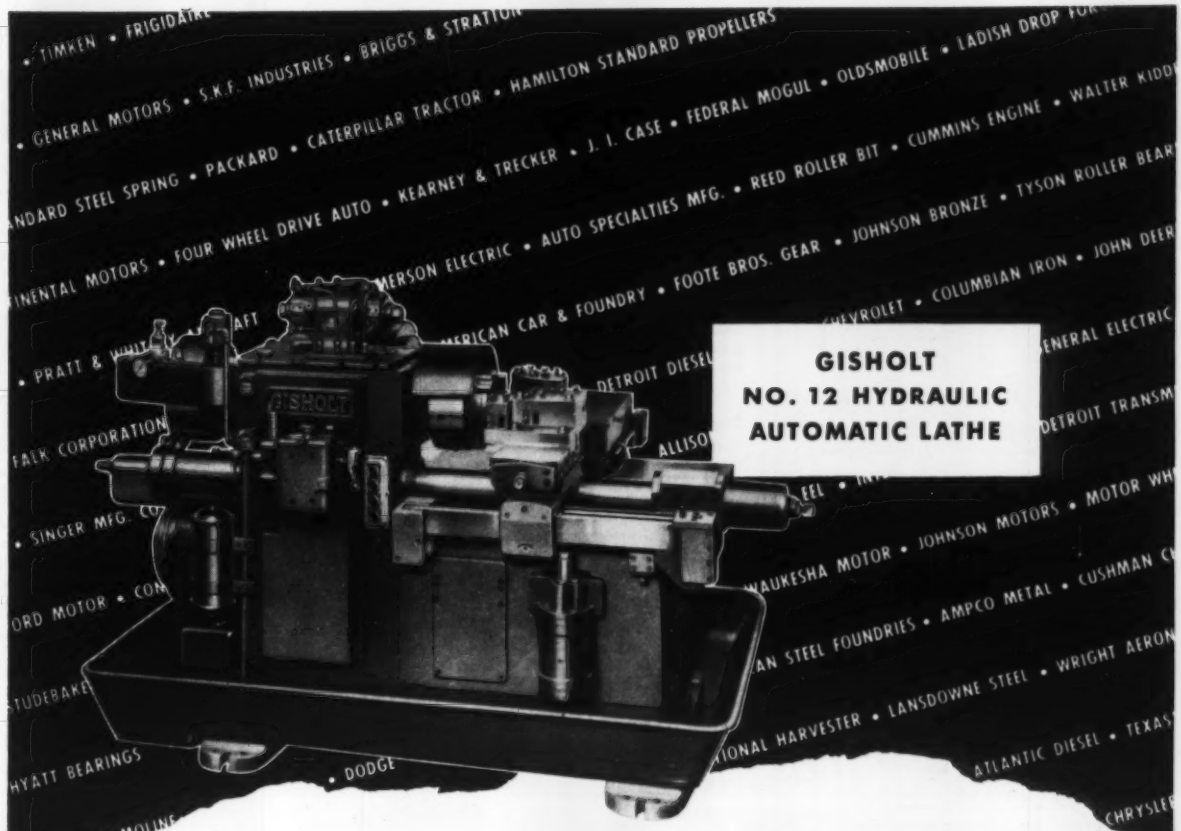

What makes this machine so popular?

It's the simple basic application of hydraulic principles—perfected through the years. It's a single spindle machine that handles all classes of work—holding with a chuck or an arbor, with fixtures, or with a work driver for between centers. Front carriage alone will perform 14 different cycles. Independent rear slide can be positioned at any angle to the work. Feeds are infinitely adjustable...not limited by cams. Here's the versatility, the speed, the automatic cycle, and the easy change-over that mean big savings for scores of users. Why not for you?

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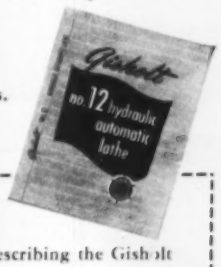
represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

This new catalog will show you why.

All operating features are clearly described, fully illustrated. Here, too, are 28 different jobs to show many classes of work and tooling possibilities. Write for your copy.



Gisholt Machine Company
Madison 10, Wisconsin

Please send my copy of the catalog describing the Gisholt No. 12 Hydraulic Automatic Lathe.

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City.....*State*.....

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COST—that's good too.

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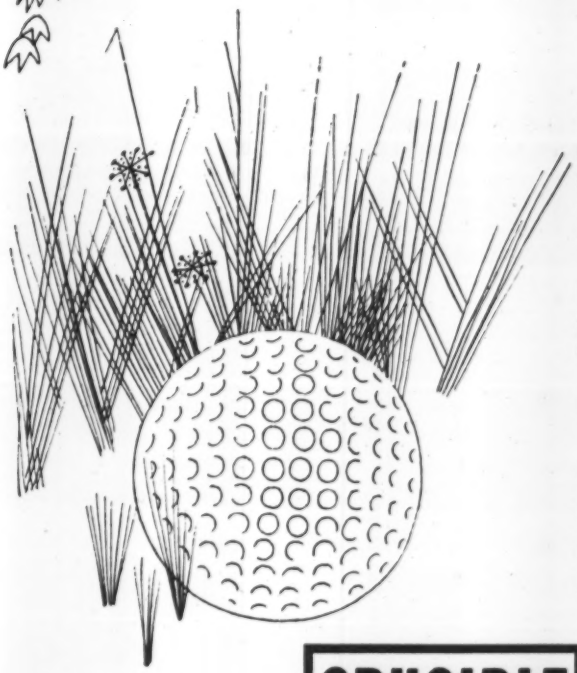

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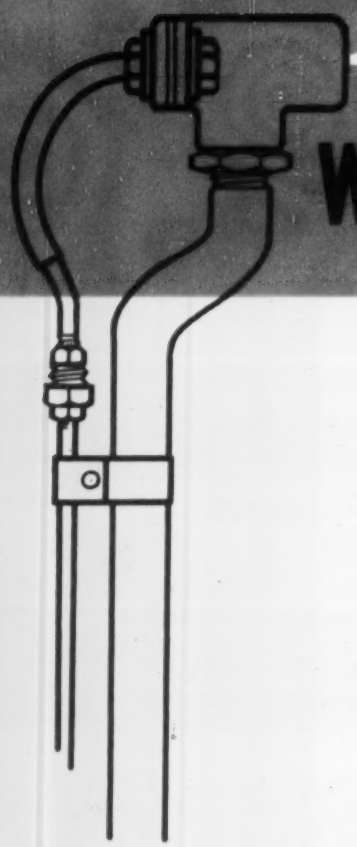

● For the benefit of the steel industry, Koppers has brought the silica-welding process to this country. This method of repairing coke ovens has been used successfully in England for many years.

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Constructing or repairing coke ovens is just one way in which Koppers serves the steel industry. For any kind of metallurgical construction, you can count on Koppers.

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KOPPERS COMPANY, INC., PITTSBURGH 19, PENNSYLVANIA

coke ovens process

CLOSE-UP of spray welding with silica sand.

COKE OVEN BEING REPAIRED by spray welding while the structure is still hot. Special silica sand is being fused to the damaged brickwork.

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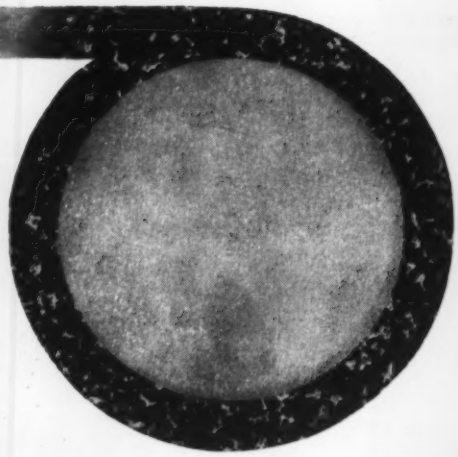

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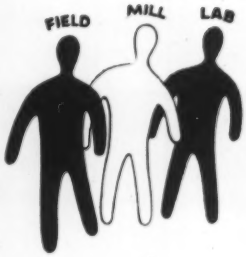

3-Dimension Metallurgical Service combines the extensive experience and co-ordinated abilities of Republic's *Field, Mill* and *Laboratory* Metallurgists with the knowledge and skills of your own engineers. It has helped guide users of Alloy Steels in countless industries to the correct steel and its most efficient usage, IT CAN DO THE SAME FOR YOU.

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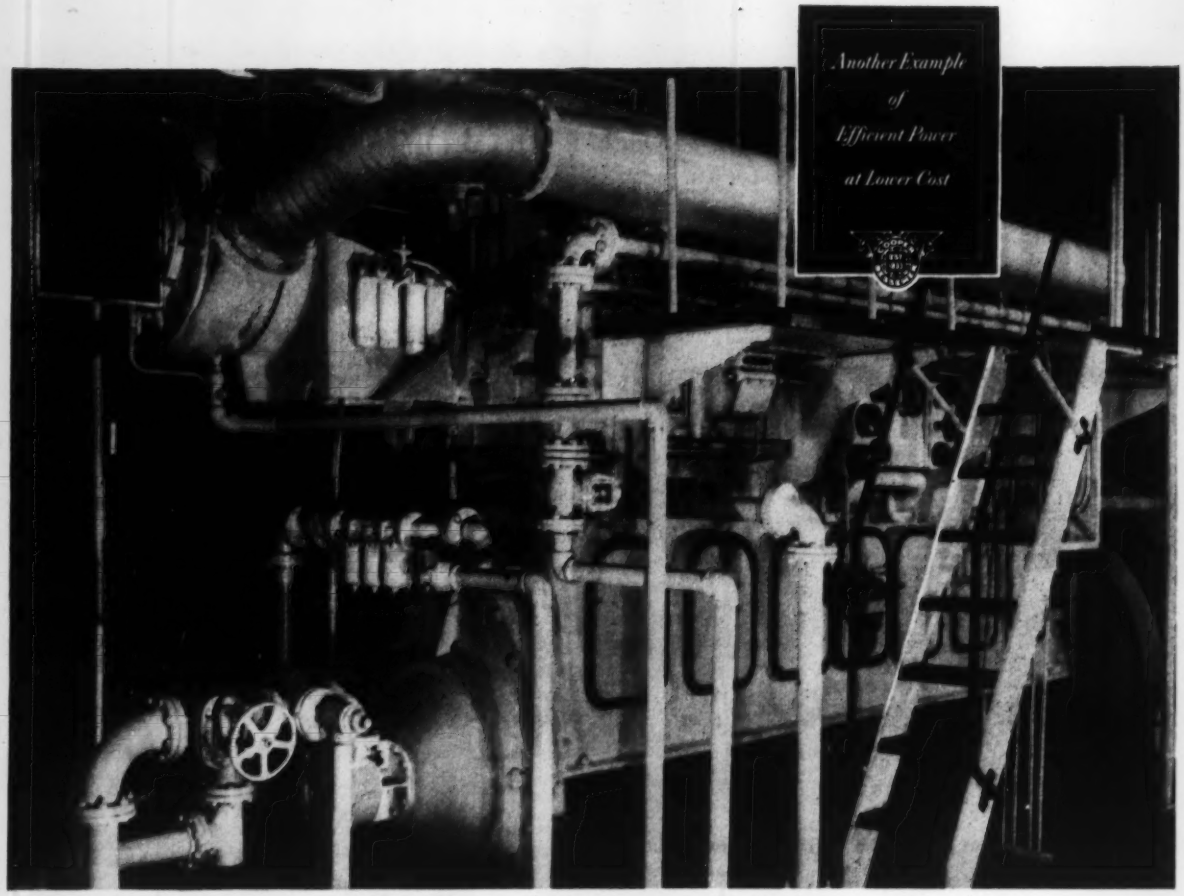

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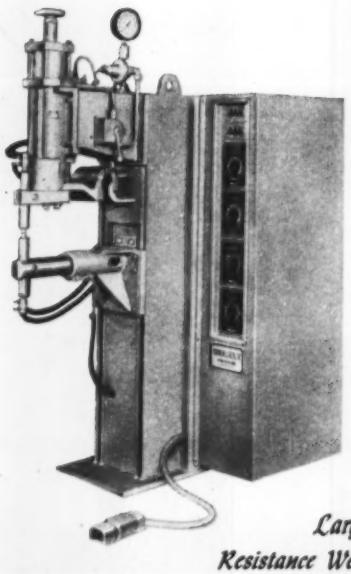

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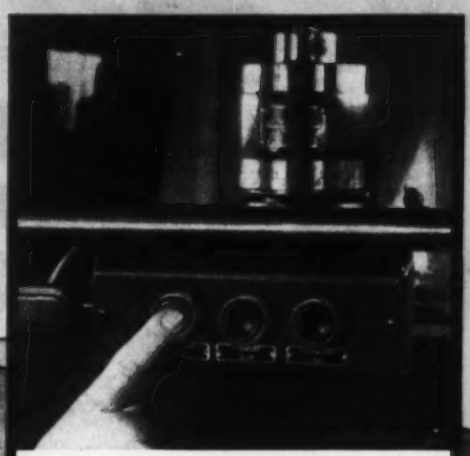

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with Less Maintenance

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Better Power Transmission Through Better Gears

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Get all the facts and figures on how Foote Bros. drives with Duti-Rated Lifetime Gears can fit into your production picture. Write today . . . or see your local Foote Bros. representative now!

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Feature space saving, longer life Duti-Rated Lifetime Gears. Available in double and triple reductions with ratios from 5 to 1, up to 238 to 1; capacities range up to 200 h.p.

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September 13-14, American Coke & Coal Chemicals Institute: Annual meeting, The Homestead, Hot Springs, Va. Institute address: 711—14th St. N.W., Washington 5. President: Samuel Weiss.

September 13-15, Allied Railway Supply Association: Annual meeting and exhibit, Hotel Sherman, Chicago. Association address: 1200 W. Chase Ave., Chicago 26. Secretary: C. F. Weil.

September 13-16, Society of Automotive Engineers Inc.: National tractor meeting and production forum, Hotel Schroeder, Milwaukee. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

September 13-24, Instrument Society of America: First international instrument congress and exposition: Commercial Museum and Auditorium, Philadelphia. Information: First International Instrument Congress and Exposition, 921 Ridge Ave., Pittsburgh 12. Managing Director: Richard Rimbach.

September 16-17, American Hot Dip Galvanizers Association Inc.: Semi-annual meeting, Hotel Dennis, Atlantic City, N. J. Association address: 1506 First National Bank Bldg., Pittsburgh 22. Secretary-treasurer: Stuart J. Swensson.

September 16-20, National Association of Waste Material Dealers Inc.: Fall meeting for metal and rubber groups, the Sagamore, Bolton Landing, N. Y. Association address: 271 Madison Ave., New York 16. Secretary: Clinton M. White.

September 20-22, Truck Body and Equipment Association Inc.: Annual meeting and exposition, Hotel Statler, Buffalo. Association address: 1616 K St. N.W., Washington 6. Executive manager: Arthur H. Nuesse.

September 20-24, American Mining Congress: Mining convention and exposition, Civic Auditorium, San Francisco. Congress address: 1102 Ring Bldg., Washington 6. Executive vice president: Julian D. Conover.

September 21-23, Society for Experimental Stress Analysis: Annual meeting and exhibit, Bellevue-Stratford hotel, Philadelphia. Society address: P. O. Box 168, Central Square Station, Cambridge 39, Mass. Secretary-treasurer: W. M. Murray.

September 22, Cutting Tool Manufacturers Association: Fall meeting, Lochmoor Club, Detroit. Association address: 416 Penobscot Bldg., Detroit 26. Executive secretary: Martin J. Ewald.

September 22-24, National Industrial Conference Board: General session for all associates on marketing, Waldorf-Astoria hotel, New York. Board address: 247 Park Ave., New York 17. Secretary: Herbert S. Briggs.

September 22-24, Industrial Truck Association: Fall meeting, Skytop Lodge, Skytop, Pa. Association address: 526 Washington Loan & Trust Bldg., Washington 4. Managing director: Wm. Van C. Brandt.

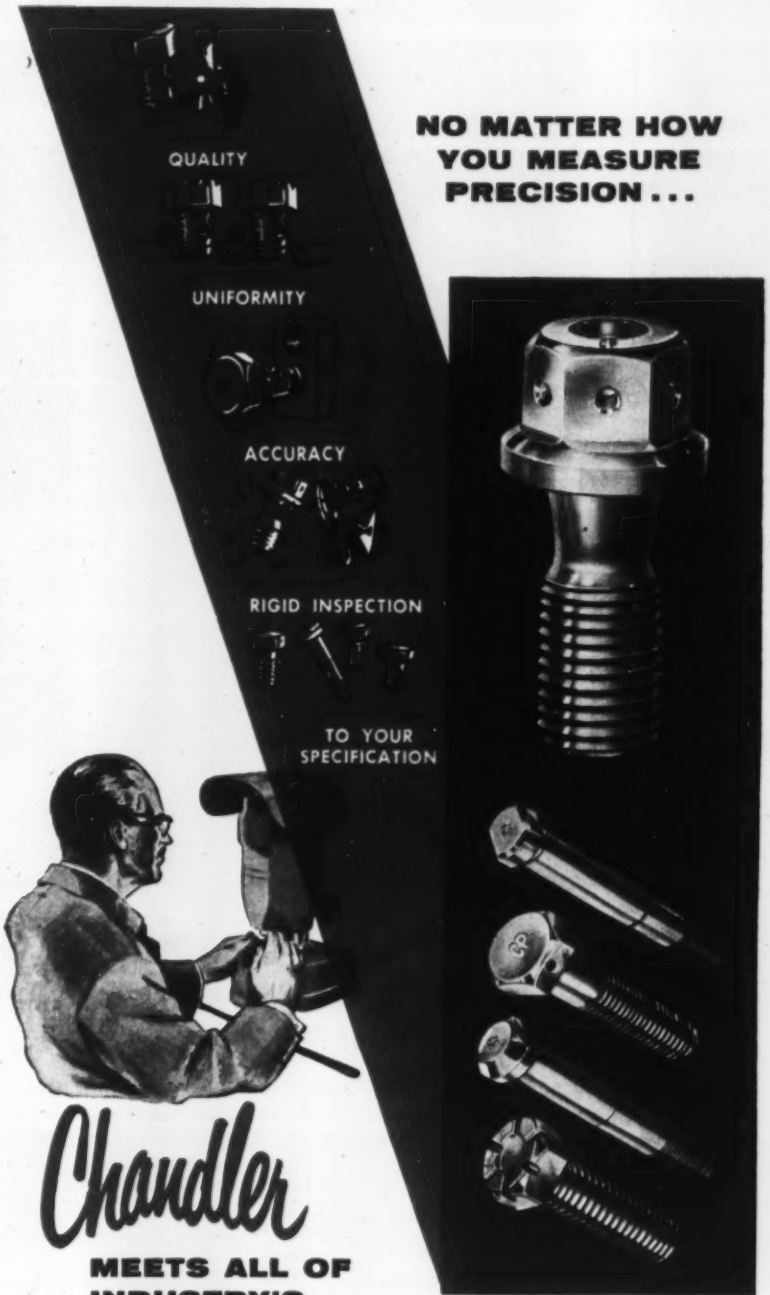
September 22-25, National Association of Foremen: Annual meeting, Hotel Sheraton Gibson, Cincinnati. Association address: 321 W. First St., Dayton 2. Secretary: Jean B. Adams.

September 23-25, Automotive Parts Rebuilders Association: Annual meeting, Morrison hotel, Chicago. Association address: 200 S. State St., Chicago 4. Secretary: Jack O'Sullivan.

September 27-28, Steel Founders' Society of America: Fall meeting, The Greenbrier, White Sulphur Springs, W. Va. Society address: 920 Midland Bldg., Cleveland 15. Executive vice president: F. Kermit Donaldson.

September 27-29, American Management Association: Fall personnel conference, Hotel Astor, New York. Association address: 330 W. 42nd St., New York 36. Vice president-secretary: James O. Rice.

September 27-30, Society of Industrial Packaging & Materials Handling Engineers: Annual exposition, competition and short course, Coliseum, Chicago. Society address: 111 W. Jackson Blvd., Chicago. Managing director: Charles J. Carney Jr.



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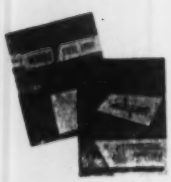

Bulletin 894 describes the descaling of Steel Strip and Bulletin 914 describes the descaling of steel sheets. Send for your copies today.

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An important message concerning a new —and unique— alloy steel

UNITED STATES STEEL is pleased to announce to all steel consumers a new steel which we feel sure will enable you to improve the performance, lengthen the life, and reduce the cost of industrial equipment. This new engineering material is USS Carilloy T-1 steel, which recently underwent some very severe testing in Birmingham, Alabama.

The development of T-1 steel began back in 1947, when our research people took a good look at a problem that had plagued alloy plate steel users for years. That problem was the multiplicity of compositions required to do everyday jobs. There was no one composition available that could serve a wide variety of applications—so our research people set out to develop such a steel. The steel we wanted had to possess many unusual attributes such as very high strength, unusual toughness, good weldability and excellent resistance to impact abrasion at temperatures from minus 150°F. up to as high as 900°F.

Today such a steel is a reality. It is USS Carilloy T-1 steel, which has been tested thoroughly, both in the laboratory and in actual service applications. To prove further the capabilities of this new Carilloy steel, Chicago Bridge & Iron Company and United States Steel this summer carried out a joint testing program on commercial pressure vessels built from T-1 steel. The results of these tests and their significance to all steel users are described on the next three pages. We feel sure that you will find the story well worth reading.

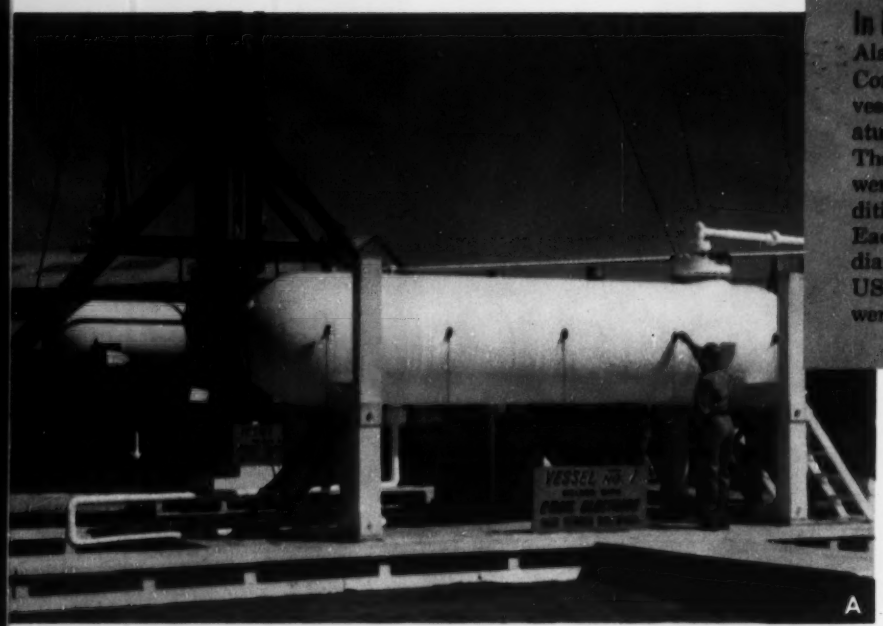
USS TRADE MARK

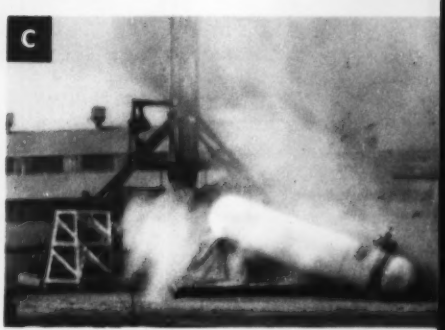
UNITED STATES STEEL

Remarkable new engineering material

PROVES SUPER-TOUGH

In May and June, 1954, at the Birmingham, Alabama, plant of Chicago Bridge & Iron Company, eight welded cylindrical pressure vessels were refrigerated to subzero temperatures and deliberately tested to destruction. The vessels were all standard designs that were built under normal production-line conditions by Chicago Bridge & Iron Company. Each vessel was twenty feet long, four feet in diameter, and made of half-inch plates of USS Carilloy T-1 steel. Four of the vessels were welded without stress relieving, using





In pressure test at 38°F. below zero T-1 steel withstands stresses 3 times its design strength

This vessel, not stress relieved, was refrigerated to −45°F. Then, with a quarter inch of white frost clinging to its sides, a high pressure pump slowly chugged the pressure in the vessel up to 938 psi. At that point, the steel itself was stressed to 45,000 psi., which is one half the yield strength of T-1 steel.

The hydraulic pressure was forced still higher, to 1875 psi. At this pressure, the stress in the steel had reached 90,000 psi.—the full *nominal* yield strength. Still, every inch of the metal was sound and all welds were intact.

Now the test really came. The pump labored on, and the pressure climbed to 2,000 psi. . . . to 2500 . . . to 2850 psi. . . . then . . .

BOOM! A jet of yellow brine burst out of the vessel and shot 200 feet through the air. The vessel finally failed at a pressure of 2850 psi. and a minimum stress of 136,000 psi. on the plates. This stress is well over three times the design strength of 45,000 psi.

The temperature of the steel at the time of failure was a frigid 38 below, yet the metal showed no sign of brittle failure. Super-tough USS Carilloy T-1 did what no ordinary steel could do at such a low temperature—it stayed *tough and ductile;* in fact it actually stopped the tear from propagating any further through the vessel.

USS

UNITED STATES STEEL

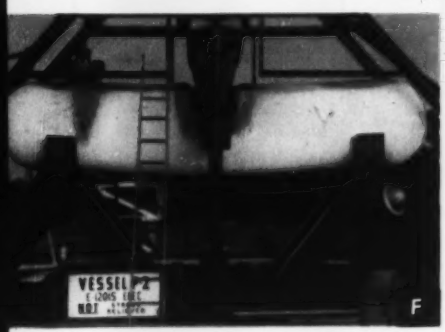
USS CARILLOY T-1 STEEL

DOWN TO 38°F. BELOW ZERO

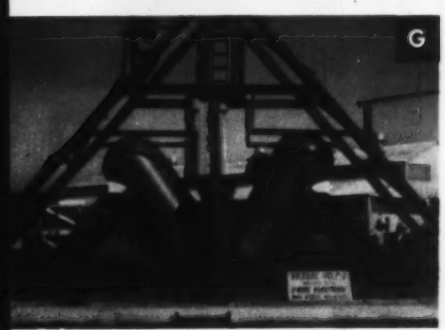
E 12015 low hydrogen coated electrodes. The other four were welded with E 9015 electrodes and were stress relieved after welding. Two vessels of each type were given two tests: a pressure burst test for strength and ductility, and an impact punishment test for toughness and resistance to the most severe impact conditions that could be devised.

Results of these tests, described below, prove conclusively the exceptional strength and toughness of USS Carilloy T-1 steel, even at temperatures far below freezing.

E



F


G

H

Frozen steel vessel made of Carilloy T-1 survives blow from 13-ton ingot dropped 73 ft.

A steel ingot weighing 26,700 lbs. has just plummeted 52 feet and crunched on top of this test vessel (Fig. E). The ingot was traveling 39 miles per hour when it hit. It struck with an impact energy of about 1,400,000 ft. lbs., bounced fifteen feet, and crushed down again on top of the vessel.

This vessel was welded without stress relieving. It was refrigerated to 33°F. below zero. It was pressurized to 1,875 psi. equal to a stress on the plates of 90,000 psi.—the steel's *nominal* yield strength. Yet, it did not fail. The ingot left only a 7/16 inch dent in the top, with a slight bulge on either side of the dent.

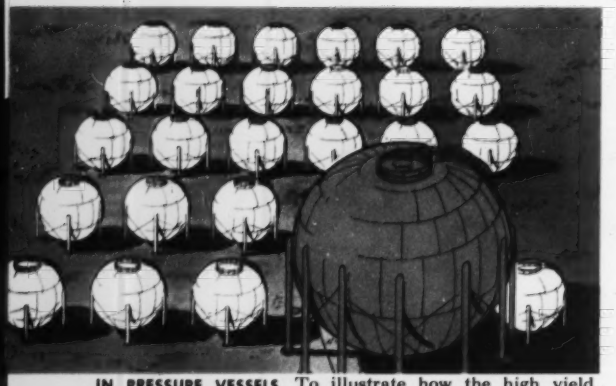
The test was repeated (Fig. F). This time the ingot was raised 73 feet, then dropped. It pounded down again on the very same spot on top of the vessel. Traveling at 46.7 miles per hour, it hit with an impact blow of 1,960,000 ft. lbs. The dent merely deepened – the steel and all welds were still intact.

Again the test was repeated (Fig. G). Now dropped from 101 feet, the 13-ton ingot ploughed into the top of the vessel at a speed of 55 miles per hour, hit with an impact of 2,750,000 ft. lbs. This time the vessel failed. But it didn't shatter. It didn't crack. It tore open like a tough piece of hickory. In other words, it failed without any signs of brittleness, even though the temperature of the steel was now minus 22°F.

In addition to this tremendous resistance to impact abuse, combined with remarkable sub-zero toughness, Carilloy T-1 steel also gives you excellent resistance to impact abrasion . . . good high temperature strength . . . and exceptional weldability.

Turn the page to see how you can use this remarkable new steel to cut costs and improve performance in a great variety of products.

Here's where you can reduce costs with USS Carilloy T-1 steel



IN PRESSURE VESSELS. To illustrate how the high yield strength of Carilloy T-1 steel can pay off here, consider this fact: To store 25,000 bbls. of propane at 210 psi would ordinarily require 25 mild carbon steel vessels. In contrast, only *one* large vessel made of T-1 steel of the *same* thickness would do the job. This single T-1 vessel would require 1/3 less shell material, 14% less foundation concrete, 70% less welding and 84% less space.

IN STEEL MILLS. In skip cars, T-1 steel in the bottoms, sides, and bail plates lasts three times longer than steels now in use. T-1 steel also gives exceptionally long service in coke bins and chutes, in ore transfer cars, in draft lines, in conveyor chains, and crane hooks. In clamshell buckets, T-1 steel has taken heavy abuse at temperatures from 500° to 600° F. and lasted *nine times* as long as the wear resisting steel previously used.

IN EXCAVATING EQUIPMENT. The dipper stick, bail, and bucket of this big electric shovel are fabricated of T-1 steel plate. The superior strength and durability of Carilloy T-1 made it possible to increase the capacity of the bucket from 35 to 45 cu. yds.

• The pressure vessel tests described on the previous pages indicate only one of the many possible uses of Carilloy T-1 steel. For this new engineering material has advantages not only in pressure vessels and storage tanks, but it also has proved itself in power shovels, bulldozers, mining machines, mine cars, steel mill ladles, blast furnace draft lines, lift trucks—in high speed rotating machinery, in stamping or forging presses. It is being considered for use in tension members of cantilever bridges and other similar applications where tension members are involved.

With the 90,000 psi. minimum yield strength to work with, combined with extraordinary sub-zero toughness, good high temperature strength to 900° F., and excellent resistance to impact abuse, impact abrasion, and atmospheric corrosion, you can use T-1 steel to reduce the size and weight of heavily stressed parts. This cuts your shipping and handling costs, as well as the cost of material, and the cost of foundations and supports where they are needed. Carilloy T-1 steel lengthens the life of your equipment, cuts repair bills and outage time. And remember, wherever you use T-1, you can weld or flame cut it either in the shop or in the field without expensive heat treating equipment. This cuts costs still further.

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The circuit shows a Denison Surge Damping Valve preventing hydraulic shock when stored-up energy in an accumulator is released. For a bulletin on the surge valve, write to: THE DENISON ENGINEERING COMPANY, 1163 Dublin Road, Columbus 16, Ohio.

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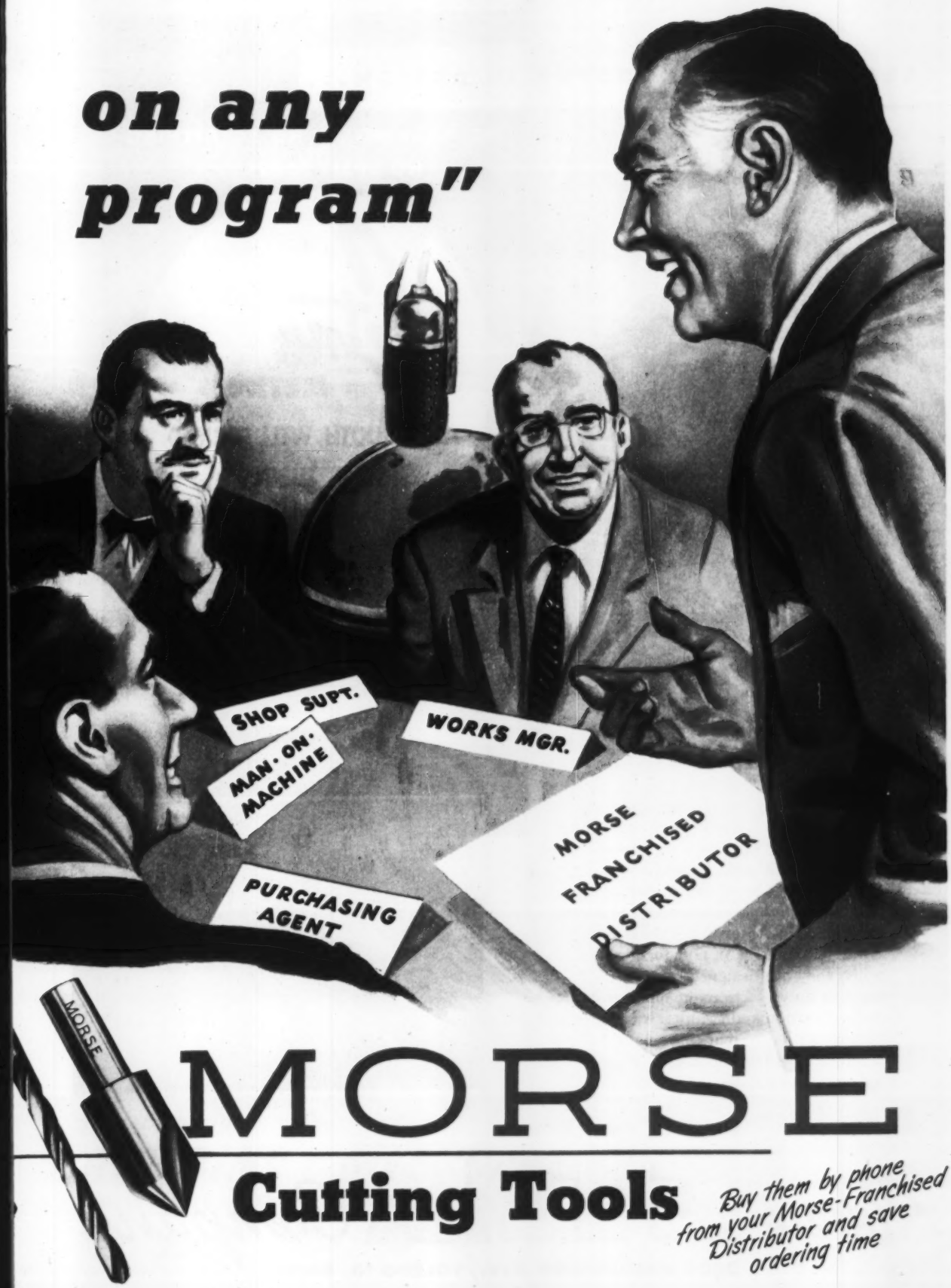

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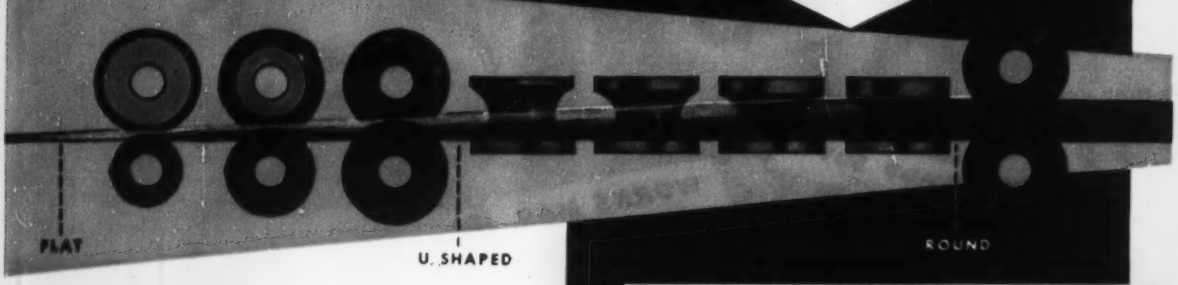

Exclusive with Etna is the cluster unit. This unit progressively rolls the tube into shape without excessive stretching of the edges, thereby eliminating the "buckling" experienced with ordinary tube mills. Etna machines are not forming mills, they are designed for one purpose only . . . to make clear, well formed carbon and stainless steel tubing with no marking, no scratching, no upset edges. Write for complete details.

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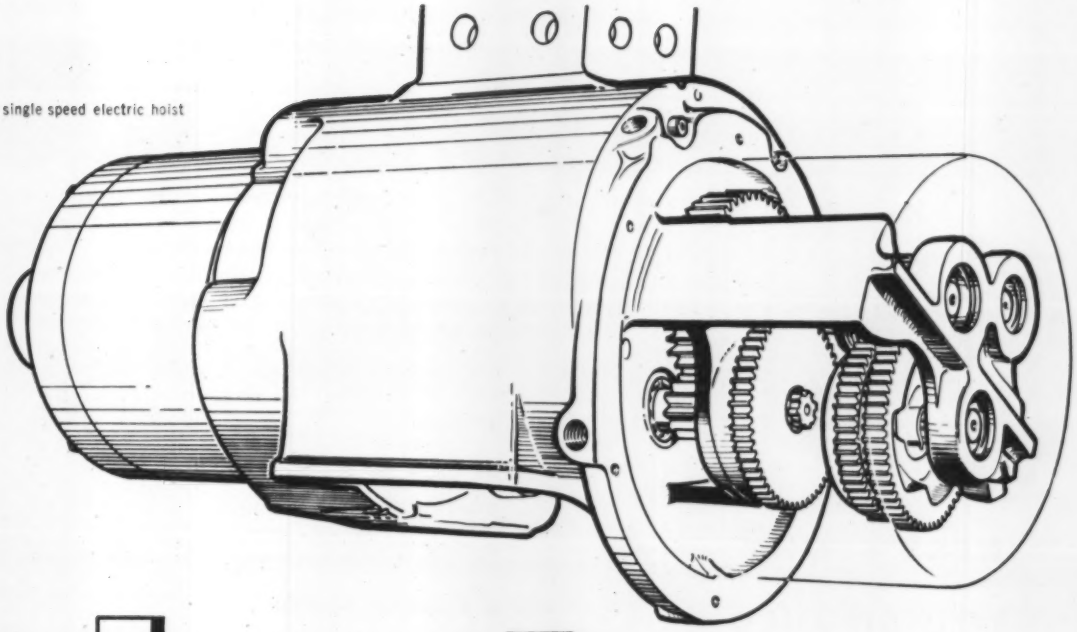

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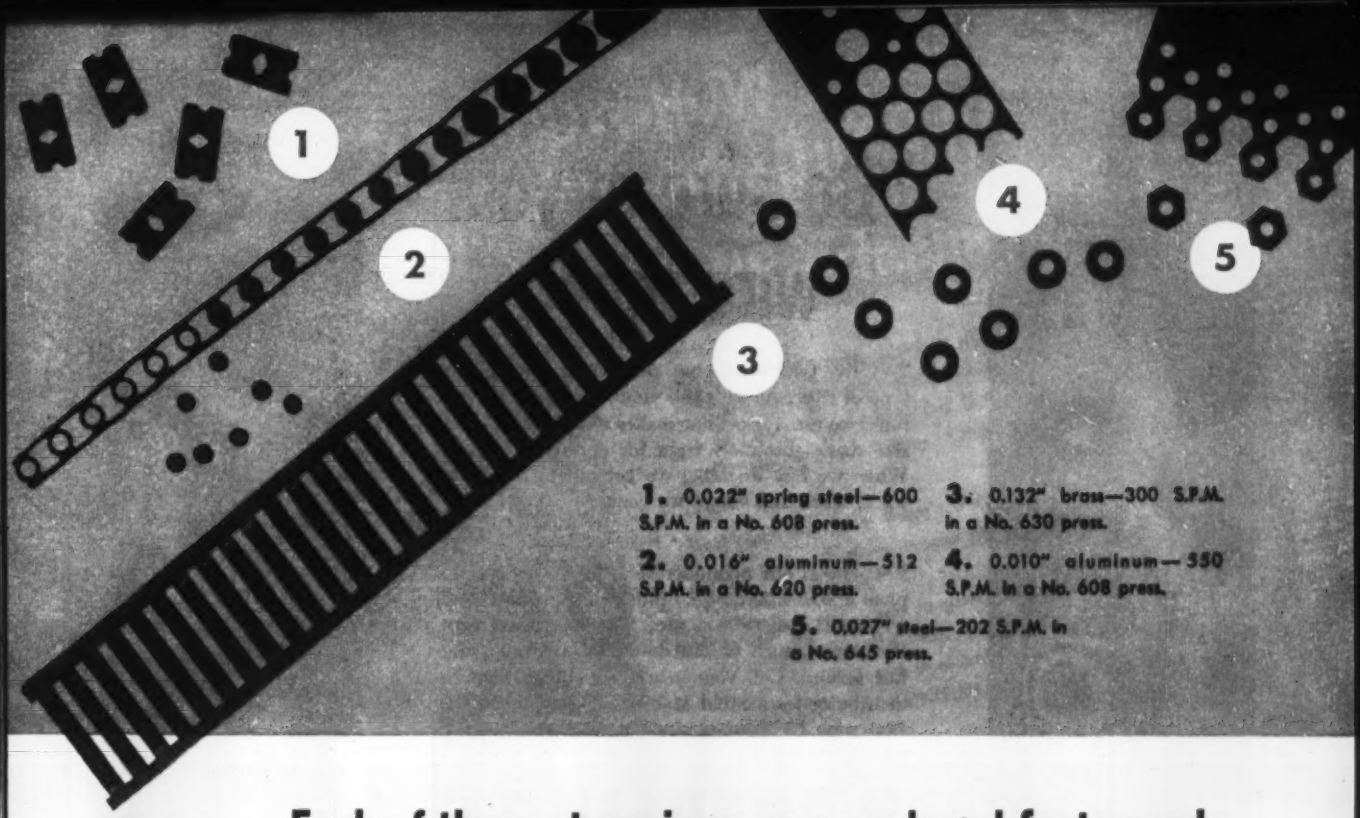

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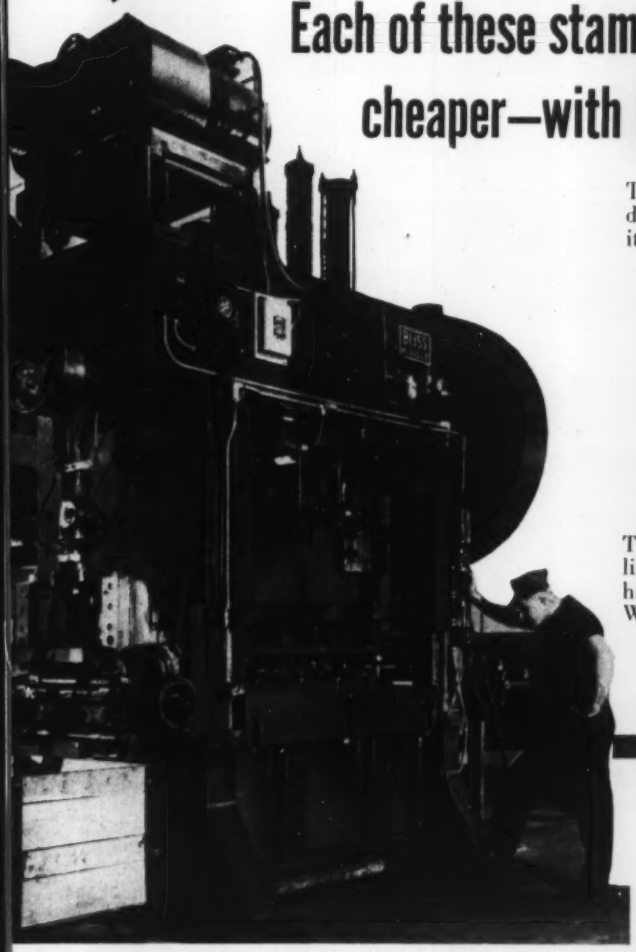

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ONLY the correct grinding wheel on each job can give you minimum grinding costs — can bring to your grinding the "TOUCH OF GOLD" that is so necessary in these competitive times.

And right near you there's a Norton abrasive engineer or a factory-trained Norton distributor man who can see that you get that correct wheel. He's an expert in grinding wheel selection and he has the most complete variety of wheels in the industry to select from — including the exclusive 32 ALUNDUM abrasive and the new G bond.

Back of him, continually developing still better abrasives and bonds to do your grinding jobs even more economically, are the largest and best equipped research laboratories in the industry — plus the facilities of the world's largest and most modern grinding wheel plant.

Making better products...to make other products better

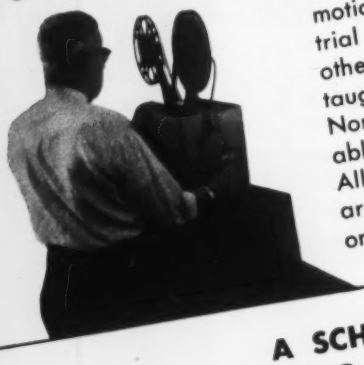
GRINDING KNOW-HOW

. . . in print . . . in film . . . in class

PAGES AND PAGES OF PRODUCTION-BOOSTING INFORMATION

Between the covers of these booklets and in the monthly technical magazine "Grits and Grinds" you'll find a wealth of grinding know-how — information on all phases of grinding, both tool room and production. The apprentice will find them invaluable and even the experienced operator will pick up many helpful hints for increasing production and cutting grinding costs.

A SERIES OF GRINDING FILMS WITH COLOR AND SOUND



"Lessons in Grinding" is the title of a series of eight motion picture films which are available to industrial apprentice schools, vocational schools, and other places where machine shop practice is being taught. There are also five other more general Norton films on grinding that are especially suitable for engineering groups and society meetings. All Norton films are loaned without charge — all are color 16mm. sound-on-film. Descriptive folders on reauest.

A SCHOOL OF GRINDING FOR GRINDING FOREMEN AND SUPERVISORS

A one-week course of visual and oral instruction at the Norton plant is available for grinding department and tool room foremen, process and time study engineers and training supervisors. The course is also available to college and school shop instructors. Classes are conducted in the well-equipped Norton School of Grinding and offer up-to-the-minute and practical instruction and demonstrations in the selection and efficient use of grinding wheels and other abrasive products.

For enrollment details and further information on the course, customers and educational institutions are invited to address their inquiries to Norton Company, Educational Service Department, Worcester 6, Massachusetts.

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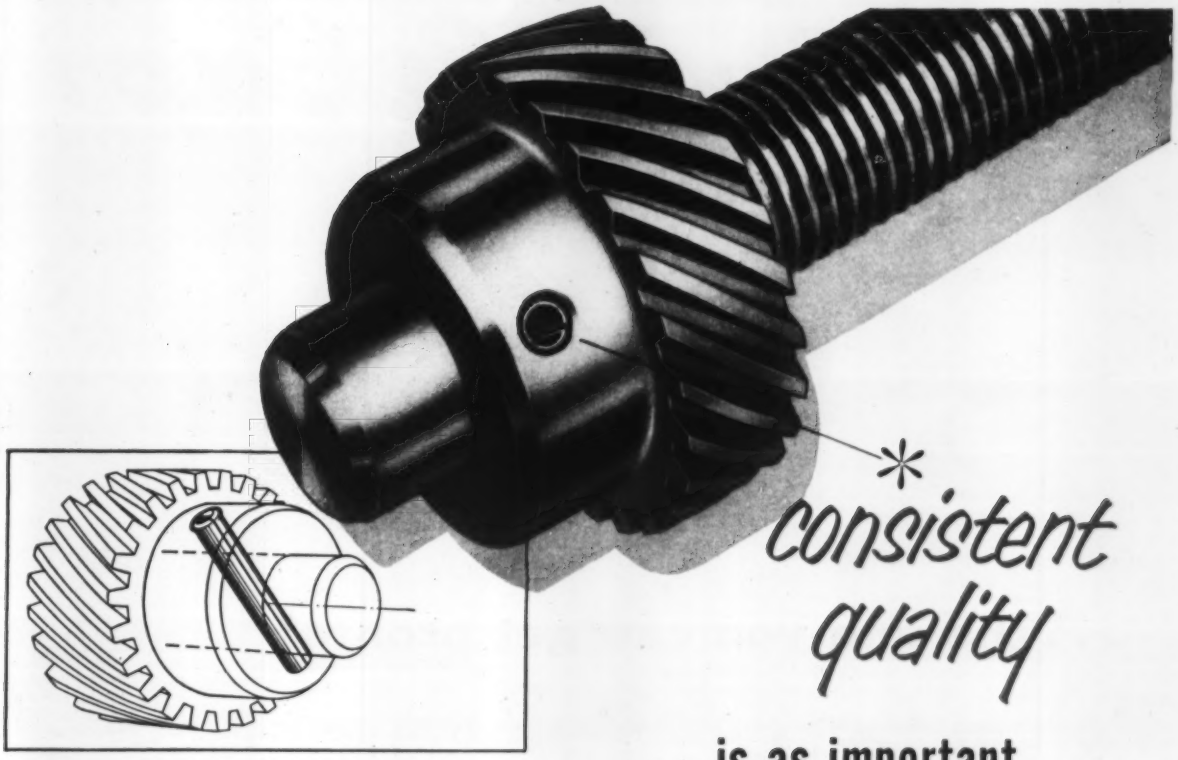
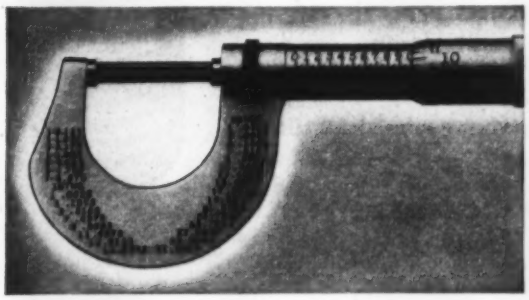


*consistent quality

is as important in the pin as in the gear

To function effectively, a spring pin must drive easily into holes drilled to normal production tolerances, compressing as driven. To drive easily, hold firmly and fit flush, the pin —*every* pin—must meet the strict requirements of specifications such as those prepared by the SAE and the Military Services.



Since failure of a pin can be as costly as a failure of any other precision part, it is important to check the pins *you* buy for uniformity . . . uniformity of diameter and length, shear strength, hardness, insertion and removal forces, and recovery of diameter.

Rollpin has been tested many times—by many manufacturers—with a consistently high performance record. It has been widely recognized as the "quality" fastener of its type. In this case, quality can be—and should be—measured. We strongly urge that you test for quality when buying spring pins.

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Dept. R28-960, Elastic Stop Nut Corporation of America
2330 Vauxhall Road, Union, New Jersey

Please send the following free fastening information:

☐ Rollpin samples
☐ Rollpin bulletin
☐ Here is a drawing of our product. What self-locking fastener would you suggest?

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. . . the one you can get pronto!

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We can't resist a rave about the product—CleCap's double extruded Socket Screws . . . Real *sockets* you'll admire—they're true hex, sharp cornered to give the key good "purchase", and *clean,* clear to the bottom.

"Sockets" are just one of the fastener styles CleCap makes. On any of the items cataloged below, let CleCap show you how they can make your idea of delivery a reality. If you haven't tasted CleCap service you've missed a thrill.

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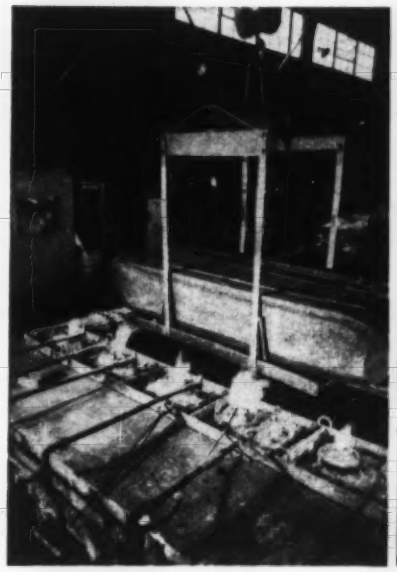
Facilities to make larger diameters than listed.

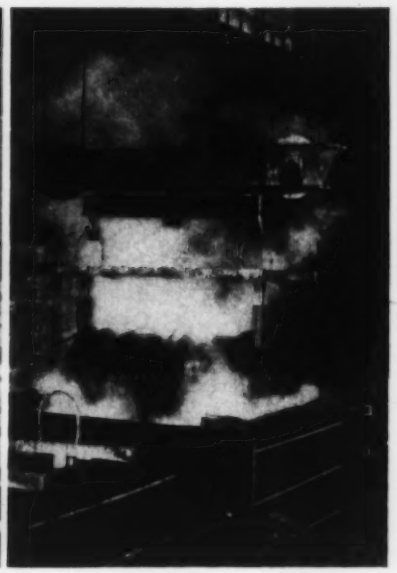
Ask Your Jobber for CleCap!

Originators of the Kaufman DOUBLE EXTRUSION Process



TOOL STEEL SHEETS

STAINLESS STEEL BAR STOCK



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WITH THE DU PONT SODIUM HYDRIDE PROCESS

In 10 to 20 minutes, sheets, bars, wire, rods, forgings and fabricated articles are completely descaled with the Du Pont Sodium Hydride Descaling Process. Even heavily scaled forgings (½" scale thickness) take less than an hour. And in only 15 seconds you can get cold reduced-annealed strip clean and bright!

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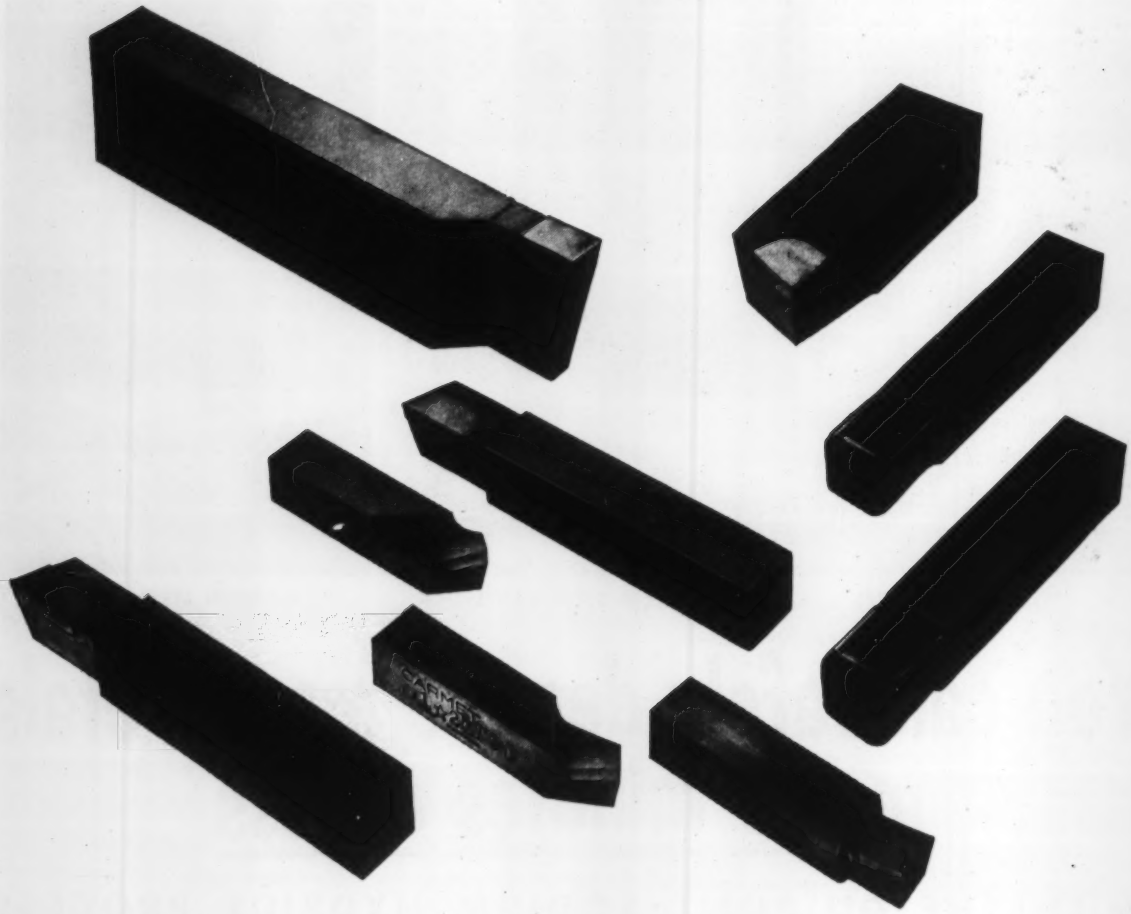

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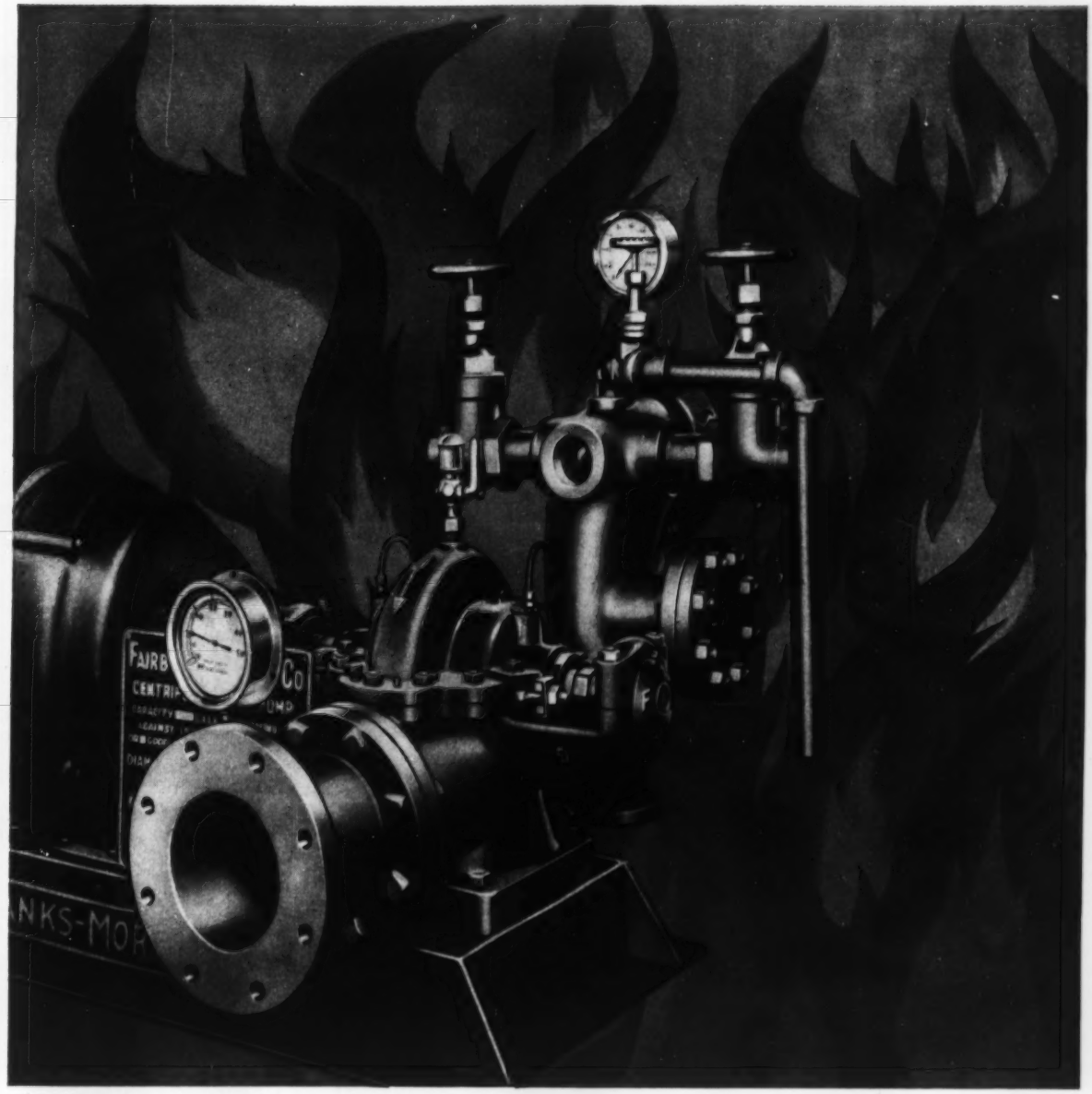

may you never need it . . . but . . .

. . . if you do, this is the fire pump you can depend on, Fairbanks-Morse. And where else is quality, dependability more important than in a fire pump. True, they may never be called upon . . . true, they may operate but seldom, but when they are needed, they *must* be ready.

That is why no design, material or manufacturing step that can contribute to reliability . . . to unfailing operation . . . is overlooked.

That is why we say "may you never need it, but this pump will always be ready if you should."

For the fire pumps you can depend on, contact your nearby Fairbanks-Morse Branch, pump dealer, or Fairbanks, Morse & Co., world's largest manufacturer of a complete pump line, Chicago 5, Ill.

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A Tiger for Work

FOR WOOD, PLASTICS, PLYWOOD, AND NON-FERROUS METALS, here's a new band saw with hard teeth and a flexible back designed for extra long life and fast, free cutting. Simonds new Sabre Tooth Blade cuts so easily — work practically feeds itself.

Made of tough alloy steel, this specially designed tooth with a hook actually holds a keen cutting edge far longer, gives better service all along the line.

You'll find a Simonds Sabre Tooth does *more work* at *lower cost* than your present blade. Try it on your next job and see how it can cut your blade and production costs. All standard sizes in coils or welded-to-length are now available from your Industrial Supply Distributor's stock.

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Lowest manual welding costs are achieved with "Jetweld", the high speed welding electrode developed and introduced by Lincoln, and "Fleetwelder"—Lincoln's AC transformer-type welder.

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THE RESULT: Average increases in speed of 35% . . . *and more.*

CHECK LINCOLN'S NEW LOW PRICES Lincoln's new combination of lower AC machine prices and faster welding with "Jetweld" can cut your welding costs. See for yourself. Have your Lincoln representative check your requirements for electrodes and welders. Call or write.

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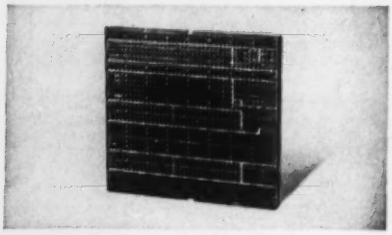
THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT

Make Sure You're Not Missing These Tooling Advantages!

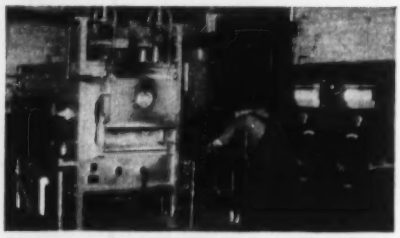
Make this *3-Minute Check* . . . Discover how a *modern* die steel can give you diemaking and production advantages no other steel offers you!

Are you aware of how tool and die steels have been improved in the last 5 to 10 years? New steels are now available that handle easier, run longer between grinds, bring down diemaking costs. Here are facts about *Vega* (Air-Tough) Die Steel—just one steel in Carpenter's Matched Set of 12 modern die steels. Compare *Vega* and what it offers, with the die steel you're using. Check it point by point. You'll see what a difference a Carpenter Matched Tool and Die Steel can mean to *your* production and profits. THE CARPENTER STEEL CO., 139 W. Bern St., Reading, Pa.

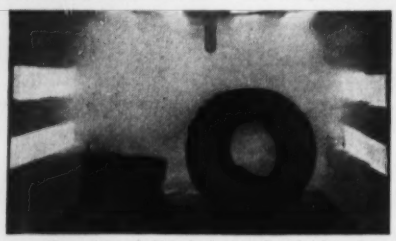
Here is what *Vega* gives you . . . *COMPARE* it with the die steel *you* use . . .



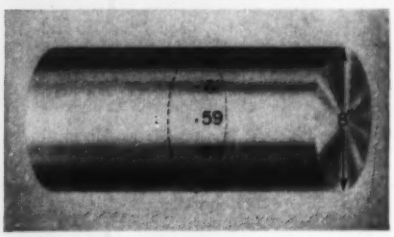
Freedom from Size Change in Hardening. The mold for this 9½" x 10½" plastic control panel has 1,280 $\frac{5}{32}$" dia. holes, six $\frac{3}{8}$" dia. horizontal ports for heating and cooling, plus eight ¾" dia. tapered holes on the edge. *Vega* was the *only* steel of many tried that could successfully hold the close tolerances of .0002" on centers of the 1,280 holes! Will the steel you use behave in hardening like this?



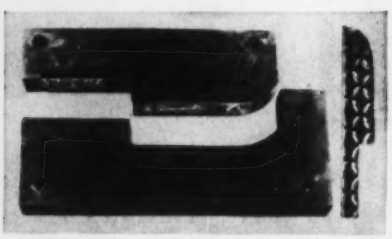
Easy, Low Temperature Heat Treating. You heat treat *Vega* from a temperature of only 1550°F (actually 200°F *lower* than the 5% chromium air-hardening grades!). No need for special, high temperature furnaces! Are you getting the benefits of *low temperature* heat treating from the air-hardening steel you use?



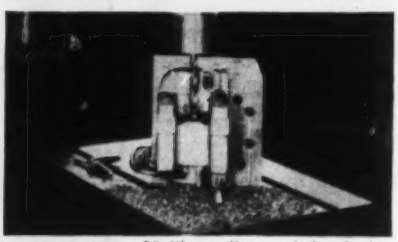
Extra Economy in Hardening. Because of *Vega's* lower hardening temperature, troublesome pack hardening to avoid excessive scaling is usually unnecessary. Does the air-hardening steel you use give you this *extra economy* in hardening?



Uniform Deep Hardenability. *Vega* gives you the advantages of uniform, deep hardenability in very heavy sections. For example, *Vega* hardens to Rockwell C-60 from surface to center in sections as large as 8" round. How does the steel you use compare on this score?



Toughness with Good Hardness. This punch and die blanks ¼" diamond threshold plates at one stroke. With previous air-hardening die steel, tools chipped and broke before any real production was made. With *Vega* these tools are in regular production—and there are no signs of wear or chipping to date. Will the steel you use perform in service like this?



Good Machinability. Unlike ordinary air-hardening grades, *Vega* has a well balanced analysis with a small percentage of hard-to-machine alloys. Field tests prove it to be one of the easiest of all air-hardening grades to machine. If the air-hardening grade you use fails to provide this *good machinability*, you're missing out on lower costs.

change to Carpenter STEEL — **Matched Tool and Die Steels**

the standard tool steels of industry

. . . *modern* die steels engineered to meet *today's* requirements!

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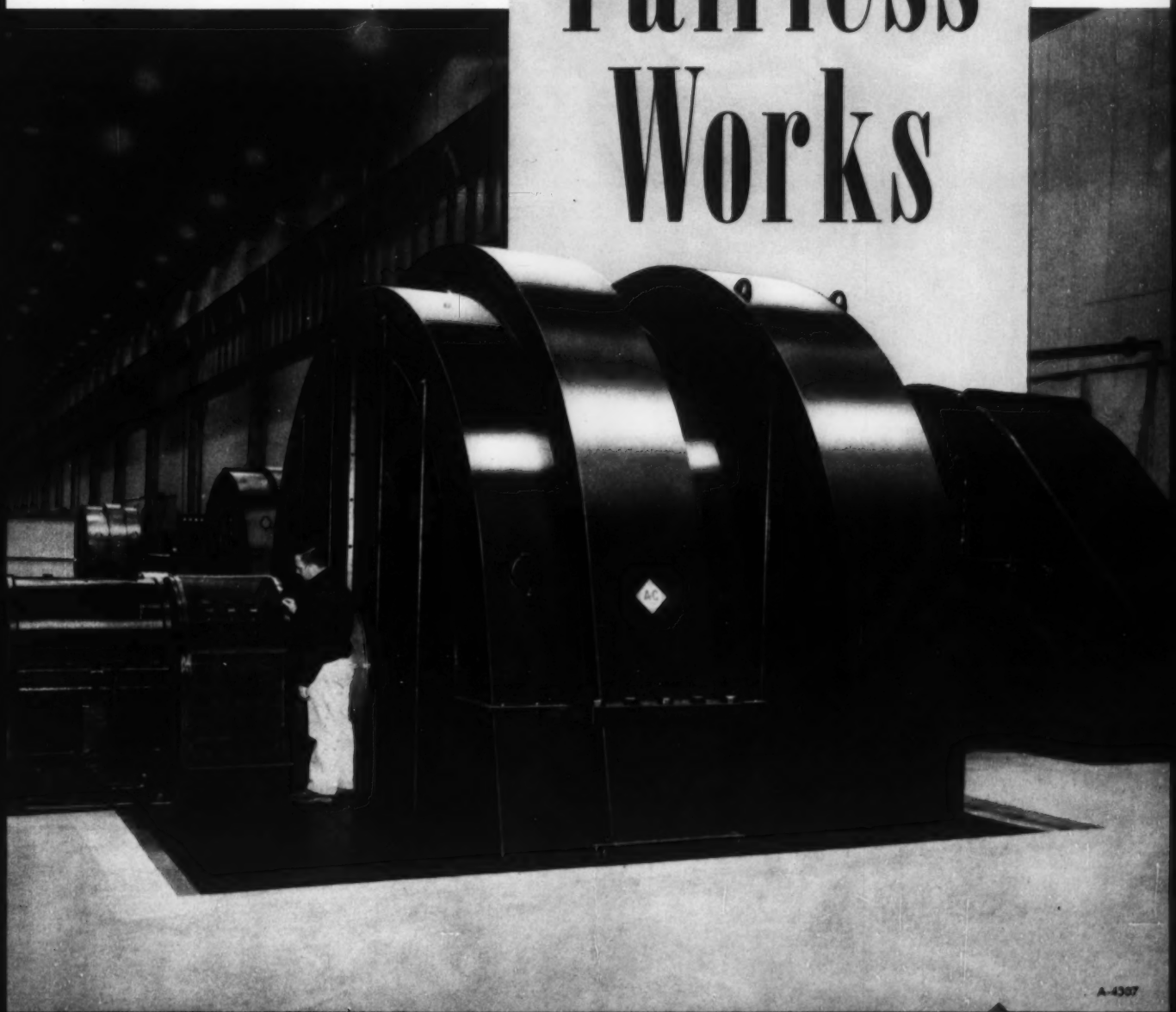
Allis-Chalmers Equipment for Steel Mill Duty at...

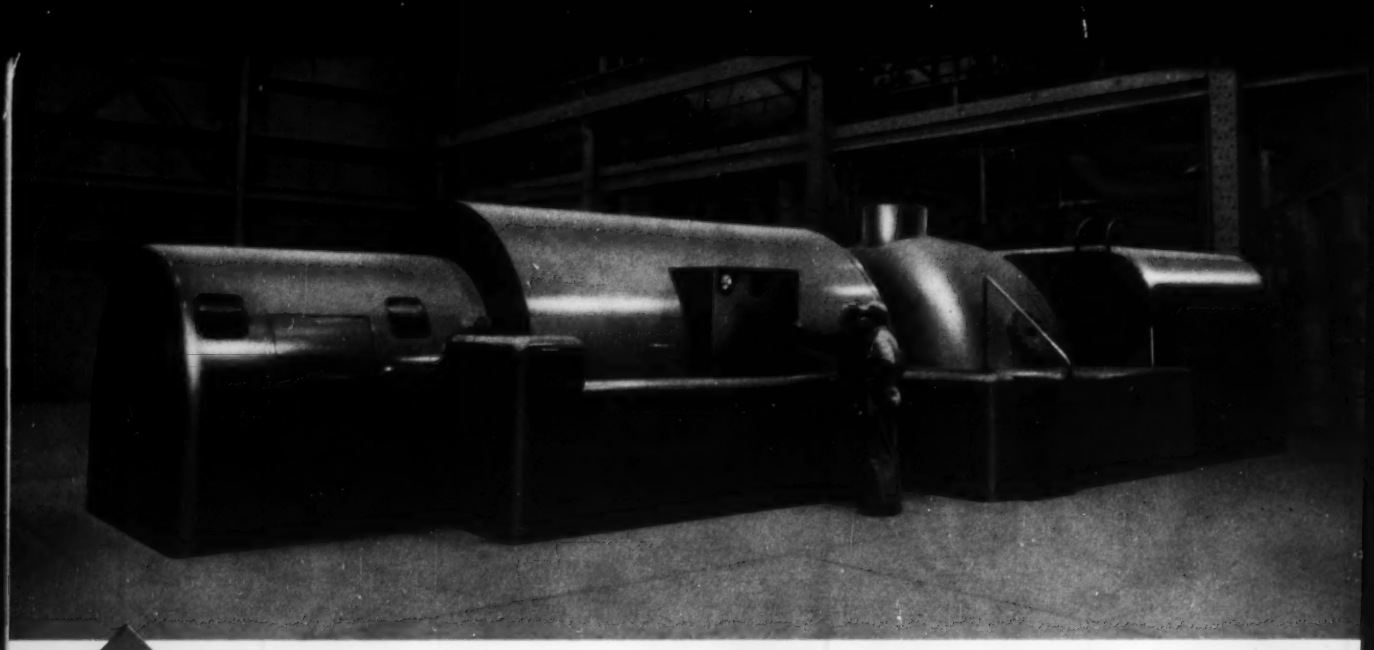
Fairless Works



A-4387

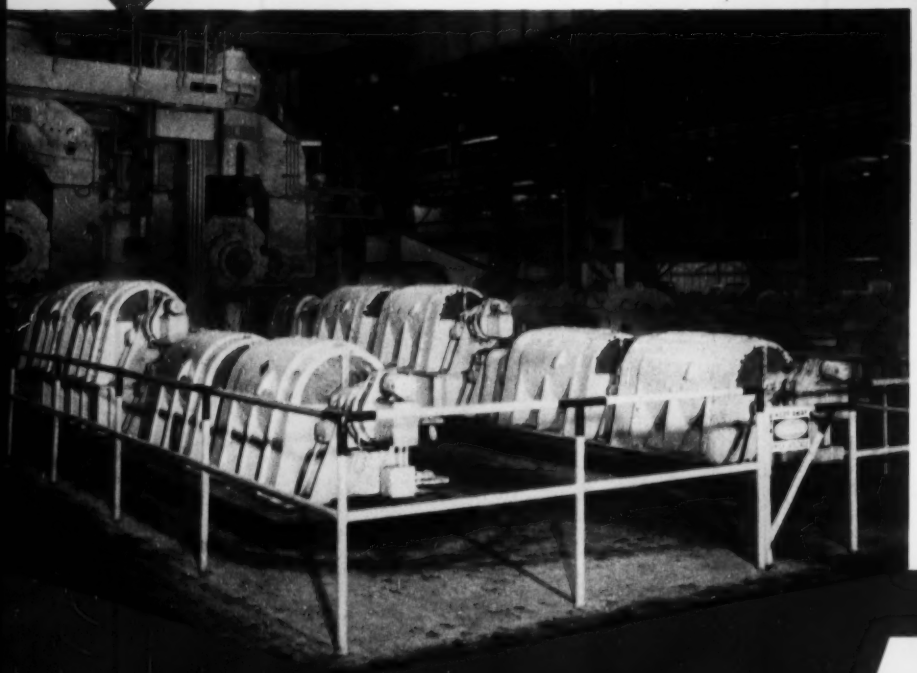
ALLIS-CHALMERS

MILWAUKEE 1, WISCONSIN



33,000 kw of steam-electric power for Fairless. Turbine features include accessibility of stop and inlet valves, centralized operating controls, self-contained and automatic steam-sealed gland system, above-the-floor oil piping and effective control of horizontal and vertical thermal movements. The generator offers simplified hydrogen seals and control, spiral stator ventilation, flexible core mounting, and "walk-in" exciter housing.

Double-armature twin drives power this two-stand tin temper mill. Driving the No. 1 stand at left are four 150-hp dc armatures. Four 200-hp armatures comprise the No. 2 stand drive at right.



Another Allis-Chalmers first . . . voltage, current and tension regulation of the two-stand tin temper mill is provided by magnetic amplifiers which offer the most modern refinements to the control circuits.

ALLIS-

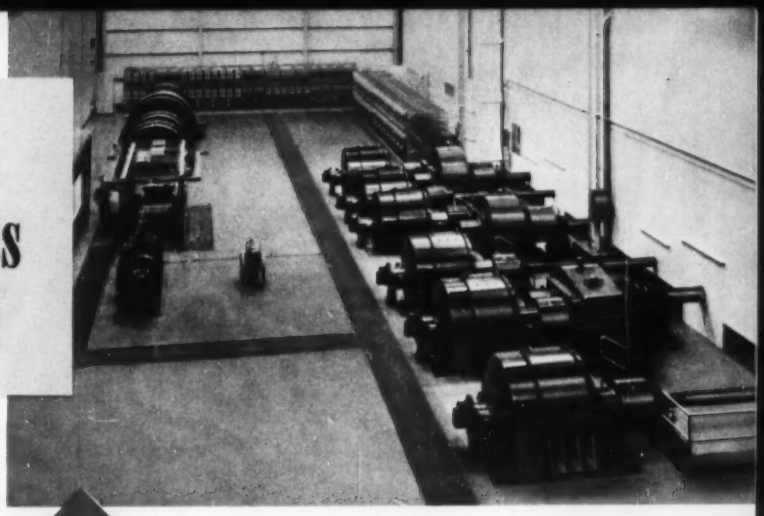
Serving Fairless Works

U.S. Steel Corporation's new integrated steel plant in the Delaware Valley, engineered for modern mill operations . . . produces its own coke, iron and steel as well as finished steel . . . is one of the largest plants of its kind in the world.

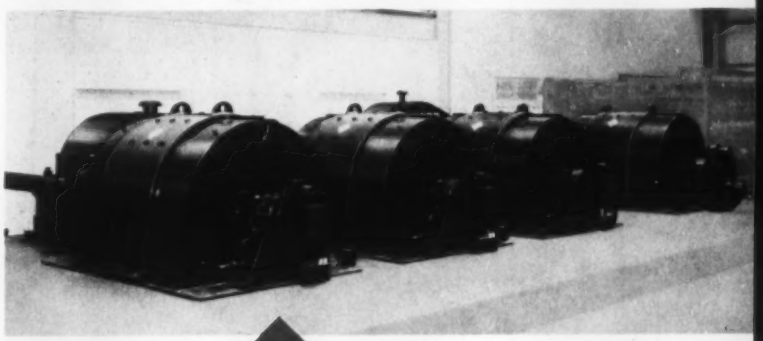
Again, as in other important mills of this vital industry, Allis-Chalmers was called upon to furnish a wide variety of equipment designed for steel mill duty.

Rolling steel requires tremendous power, a part of which is produced by an Allis-Chalmers 33,000-kw turbine generator unit. *All* 250-volt direct current for material handling . . . from ore to finished steel . . . is supplied by A-C rectifier units totaling 25,000 kw and located throughout the plant for maximum efficiency. Important rolling operations for billet mills, hot strip mill, and the two-stand tin temper mill are accomplished with controls, motors and generators designed and built by Allis-Chalmers.

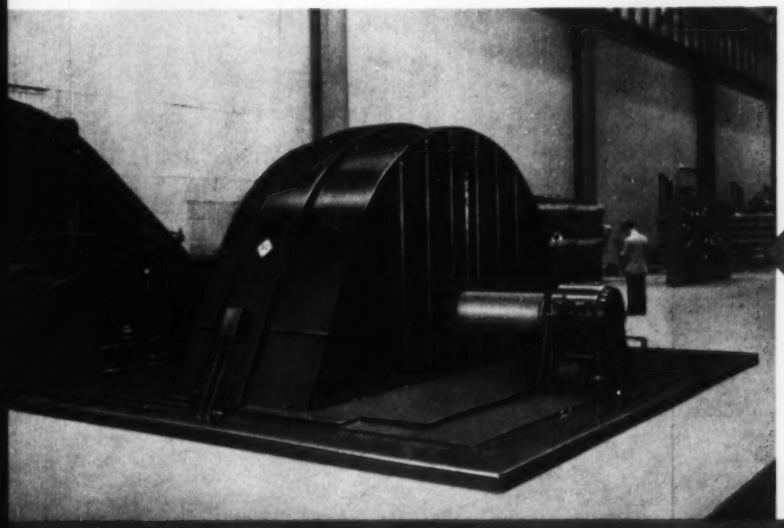
For specific information on controls, drives and other electrical equipment to meet the needs of your expansion or conversion program, contact the nearby A-C office or write to Allis-Chalmers, Milwaukee 1, Wisconsin.



Allis-Chalmers controls, motor-generator sets, and drive motors for the 30-in. billet mill. Left background shows the 8000-kw m-g unit powered by an 11,200-hp synchronous motor, variable voltage control panel, and a 3-unit 180-kw exciter m-g set. The six drive motors are rated 1750 hp, 300/600 rpm, 600 volts dc.



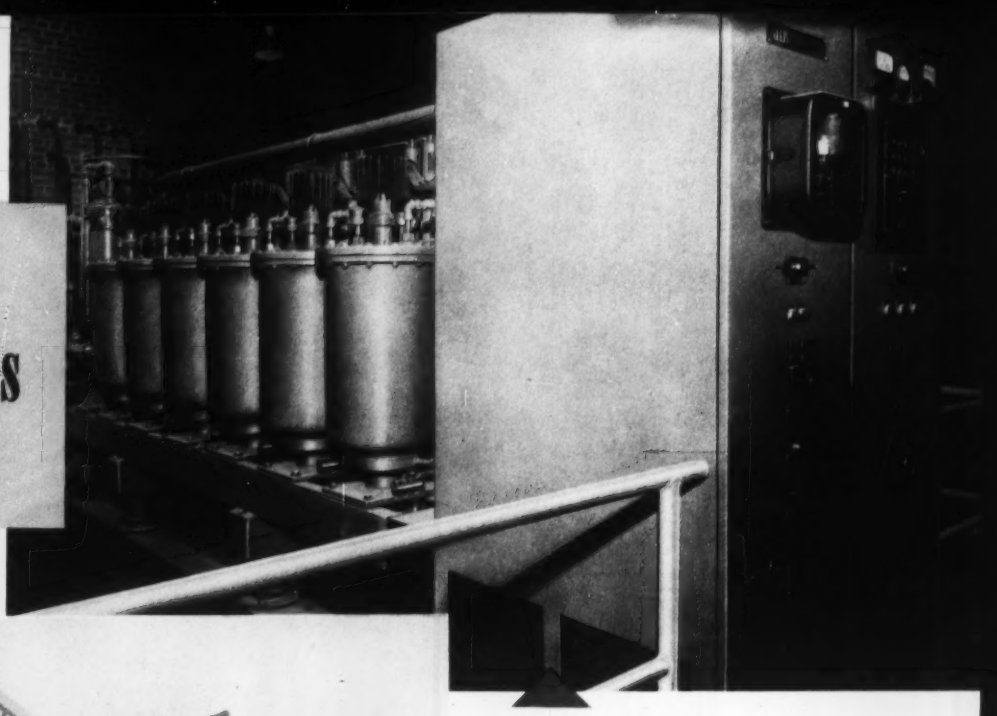
Four 1250-hp, 400/800-rpm, 600-volt dc motors driving four stands in the 21-in. continuous billet mill. Variable voltage controls, 4000-kw synchronous m-g set, and a 130-kw exciter m-g set for this mill were also furnished by Allis-Chalmers.

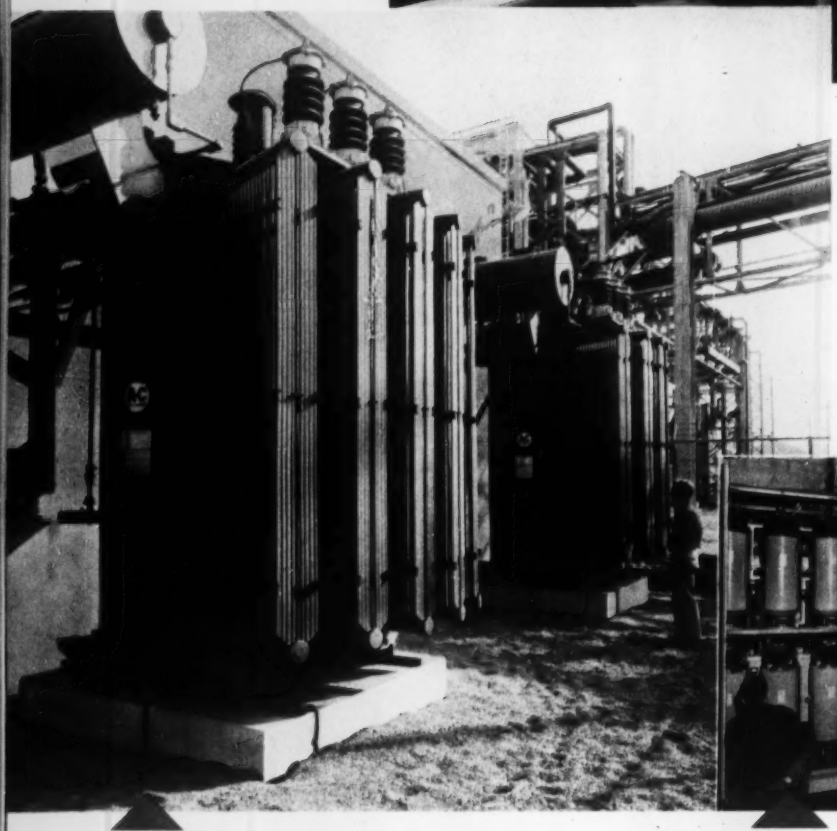


One of four universal roughing stand drives in the 80-inch hot strip mill. Operating in conjunction with the 3500-hp broadside wound rotor motor shown on the cover, these four 6000-hp synchronous motors provide power for reducing large slabs. Other A-C motors in this mill include a 2000-hp synchronous scale breaking motor and two 500-hp wound rotor motors for a vertical edger.

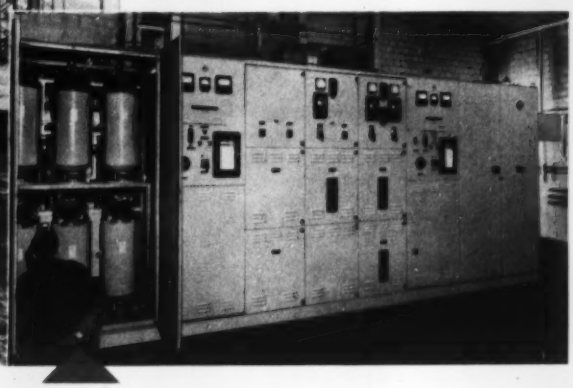
CHALMERS A-C ALLIS-CHALMERS

Serving Fairless Works





One of two 1500-kw, 250-volt rectifiers supplying direct current to cranes, pig casting machines, bailer, slag cars, and stock house equipment in Open Hearth Furnace area. Each unit substation is designed for a three-phase, 13,800-volt, 60-cycle supply and is suitable for starting and stopping by manual or remote control.



Outdoor type main transformers for two 1500-kw, 250-volt rectifier units in the Open Hearth area. These transformers are oil insulated self-cooled, with built-in interphase reactors, and are provided with ground level tap changers for ease of operation, and broad flanged wheels for use on rails or flat surfaces.

Two 500-kw, 250-volt metal-clad rectifier units supplying dc service to coke plant pusher and coke handling equipment in the Coke Oven area. Units are factory assembled and wired, complete with dc switchgear and transformers. Both rectifier units feed a common load, providing maximum availability at all times.

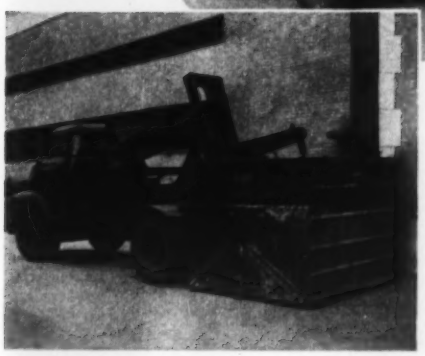
ALLIS-CHALMERS

MILWAUKEE 1, WISCONSIN

You Can't Read This Ad Without Visualizing Tremendous Savings in Your Plant

If the handling of bulk materials is required in your plant, be they raw, finished, moist, liquid or rubbish materials, read these simple facts about the Dempster-Dumpster System. Then, visualize its application and tremendous savings possibilities in your own operation.

VISUALIZE HAVING ONLY ONE TRUCK with scores of bodies. One truck-mounted Dempster-Dumpster with only one man, the driver, serving many detachable Dempster-Dumpster Containers. These containers range from 2 to 21 cu. yds. capacity for use with recommended type Dempster-Dumpsters, and each container built to suit the materials to be handled—be they solids, liquids, dust, bulky, light or heavy. You place a container at convenient materials accumulation points, in or out of plant. As each is loaded, it is picked up, hauled and dumped, or the load is set down intact, and the entire operation is handled by hydraulic controls in cab by only one man, the driver.



The photographs above were made in the plant of one of the nation's leading brands of soaps and dentifrices. This installation comprises a single Dempster-Dumpster and 49 containers. Photos illustrate the simple one man pick up, hauling and dumping operation of a drop bottom container.

THE NATION'S LEADING FIRMS USE THIS SYSTEM BECAUSE OF ITS AMAZING EFFICIENCY AND TREMENDOUS SAVINGS.

YOU ELIMINATE trucks standing idle . . . eliminate re-handling of materials . . . eliminate loading crews. You increase efficiency, sanitation and good plant-keeping with this amazing Dempster-Dumpster System—the lowest cost method of bulk materials handling ever devised. Write us now for complete information. Manufactured and sold exclusively by Dempster Brothers, Inc.

One Truck-Mounted Dempster-Dumpster Handles Scores of Containers... All Designs... All Sizes

DEMPSTER BROTHERS, 694 Dempster Bldg., Knoxville 17, Tennessee

AGAIN... *a Star Performer in* TODAY'S PRODUCTION PICTURE

B & L "1200 Series" Machining Steel

GRADES:
B & L C-1211
B & L C-1212
B & L C-1213

High-Sulphur Open-Hearth Free-Machining Screw Steel

B&L pioneered the original research in the development of this type of Cold Finished Open-Hearth Carbon Bar Steel. We have produced many thousands of tons, and such tonnage has been carefully followed through manufacturing procedures; has been subjected to extensive metallurgical investigations, and thoroughly checked by our Field Engineers for machinability and overall uniform quality at the plants of our customers, where this steel has been fabricated during the past several years.

The B&L C-1200 series steel has proven to be at least equivalent in machinability to the somewhat comparable B-1100 Bessemer screw stock grades and, since the 1200's are made by the Open-Hearth practice, they comprise a much larger tonnage per melt. This results in markedly greater uniformity, as compared with the small Bessemer melts. The C-1200 grades have identically the same chemical analyses ranges as those of the similar B-1100 grades, and the grade extras are also fully comparable.

The modern type of C-1200 steels are available in a fairly complete range of sizes in Rounds, Hexagons, Squares and Flats. Therefore, if you have not as yet used any of this steel, we know that a trial will convince you of its outstanding quality and uniformity.

Try a Steel with years of experience back of it . . . Let B&L engineers demonstrate what B&L C-1200 Series can do on your equipment. Write us for details.

BLISS & LAUGHLIN, INC.
GENERAL OFFICES: HARVEY, ILLINOIS
SALES OFFICES IN ALL PRINCIPAL CITIES

SINCE 1891

FOUR PLANTS: HARVEY, ILL. • DETROIT, MICH. • BUFFALO, N. Y. • MANSFIELD, MASS.

U. S. Patent 2184928 (others pending)

Power-Packed for Profit...

Why is Malleabrasive packed with power? Because it keeps its *punch* longer . . . retains its original grain size longer! After ordinary abrasives have shattered into "fines" and passed into the dust collector, Malleabrasive *still* stays young —alive with power!

Malleabrasive has all the toughness of malleable iron PLUS peculiar hardness characteristics provided only by our patented Malleabrasive process. This amazing combination results in fast cleaning combined with tremendous reduction in wear on machine parts. That's why foundrymen agree that Malleabrasive is the iron fist for cleaning, but the velvet glove for machine parts wear. No "fines" here to chew machine parts to bits! Malleabrasive *wears* down . . . never shatters . . . continues punching to the end!

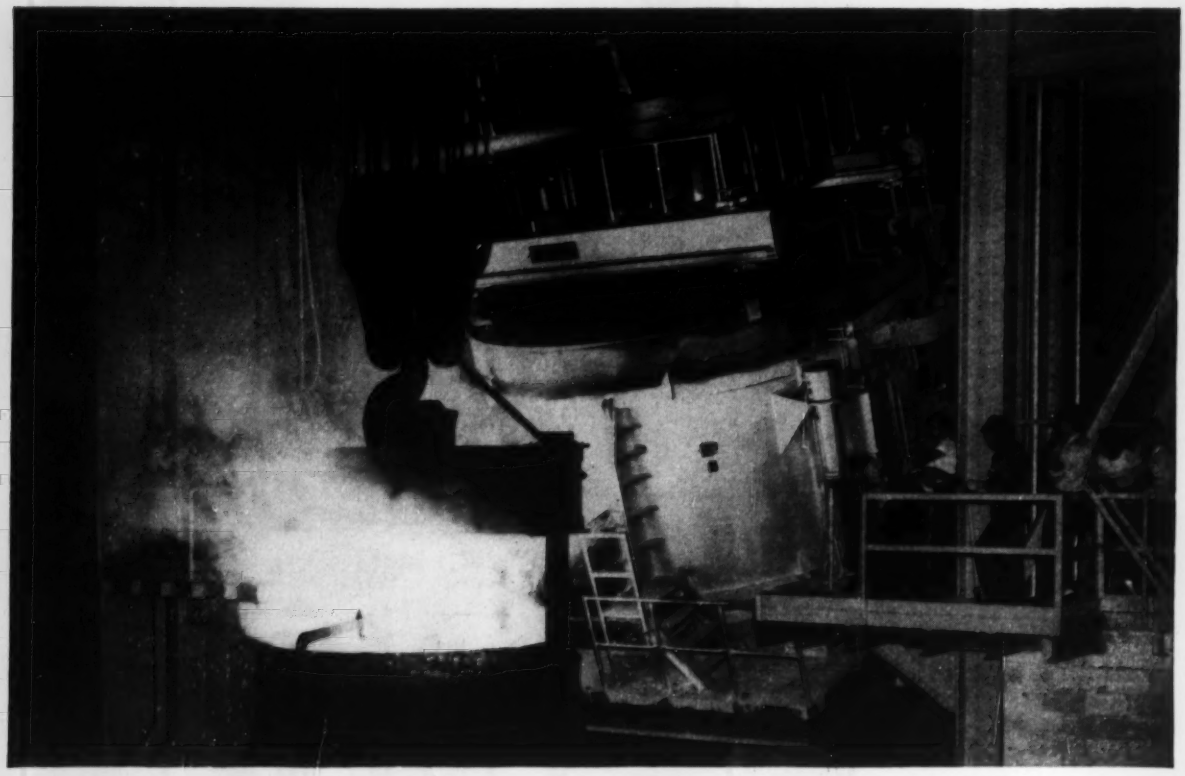
Get the full story about Malleabrasive. Write THE GLOBE STEEL ABRASIVE CO., Mansfield, Ohio.

MALLEABRASIVE®

"If you use metal abrasive, you should use Malleabrasive."

MADE BY **THE GLOBE STEEL ABRASIVE CO., MANSFIELD, OHIO**

World's largest manufacturers of Malleablized Shot and Grit
Established 1907



Atlantic Steel's 75-ton baby *breaks records for 2nd birthday*

On May 13th Atlantic Steel Company in Atlanta celebrated the 2nd birthday of their 75-ton Lectromelt* Furnace. Look at how they have increased its production with experience . . .

RECORD HEATS . . . . Feb. 15, 1953—84 tons for 41 ingots
Feb. 8, 1954—88.15 tons for 43 ingots

DAILY RECORD . . . . March 7, 1953—460.3 tons
Nov. 5, 1953—473 tons

WEEKLY RECORD . . April 19-25, 1953—16 tons/hour for 35 heats averaging 76.7 tons/heat and totaling 2,684 tons
Nov. 1-7, 1953—16½ tons/hour for 39 heats averaging 77.7 tons/heat and totaling 3,031 tons

MONTHLY RECORD . . March 1953—10,890 tons
March 1954—11,894 tons

According to Atlantic they are constantly obtaining more consistent, higher quality, and are planning to let the Lectromelt carry their major production load, firing up their open hearths only as required.

Write for Bulletin #9 describing Lectromelt melting furnaces and components. Pittsburgh Lectromelt Furnace Corporation, 323 32nd Street, Pittsburgh 30, Pennsylvania.

Manufactured in . . . GERMANY: Friedrich Kocks GMBH, Dusseldorf . . . ENGLAND: Birlec, Ltd., Birmingham . . . FRANCE: Stein et Roubaix, Paris . . . BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege . . . SPAIN: General Electrica Espanola, Bilbao . . . ITALY: Forni Stein, Genoa. JAPAN: Daido Steel Co., Ltd., Nagoya

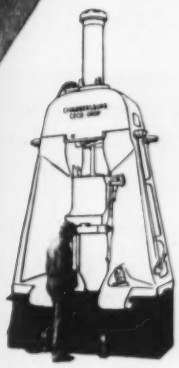
*REG. T. M. U. S. PAT. OFF.

MOORE RAPID

WHEN YOU MELT... *Lectromelt*

SCRAP that old hammer but SAVE THE ANVIL!

MOUNT A CECO-DROP UPPER-WORKS ON IT



To meet competition, your best bet is to scrap your old unproductive gravity drop hammers and install Ceco-Drops, the most modern, most productive drop hammers ever built. And for quick changeover at minimum cost, you can have Ceco-Drop upper-works fitted to your present anvil. You have all the benefits of modernization without the time and expense of replacing the anvil or disturbing the foundation.

Write for Bulletin 57-L-4

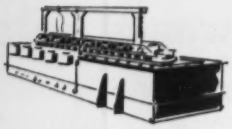
CECO-DROP

Made by the BUILDERS of THE IMPACTER

CHAMBERSBURG ENGINEERING CO., CHAMBERSBURG, PA.

WORLD LEADERSHIP IN 10 SHORT YEARS!

Simplicity of design, durability of construction and the economies of accurate plating have built Udylite leadership in automatic plating equipment in a decade



Yes, it was only ten short years ago that Udylite delivered its first hydraulic fully automatic plating machine. Since that time Udylite sales of equipment have mounted each year until today Udylite machines are in use in every country in the world where manufacturing in metal is important. In fact, the deliveries of Udylite plating machines in 1953 reached an all time high, and repeat orders were an important factor in this record.

Ingenious engineering is one of the reasons behind the Udylite success story. Many Udylite machines have been in operation for 24 hours a day, seven days a week for years. And all of this performance with practically no replacements. In fact, the recommended *spare part list for the Udylite machine totals less than one hundred dollars.*

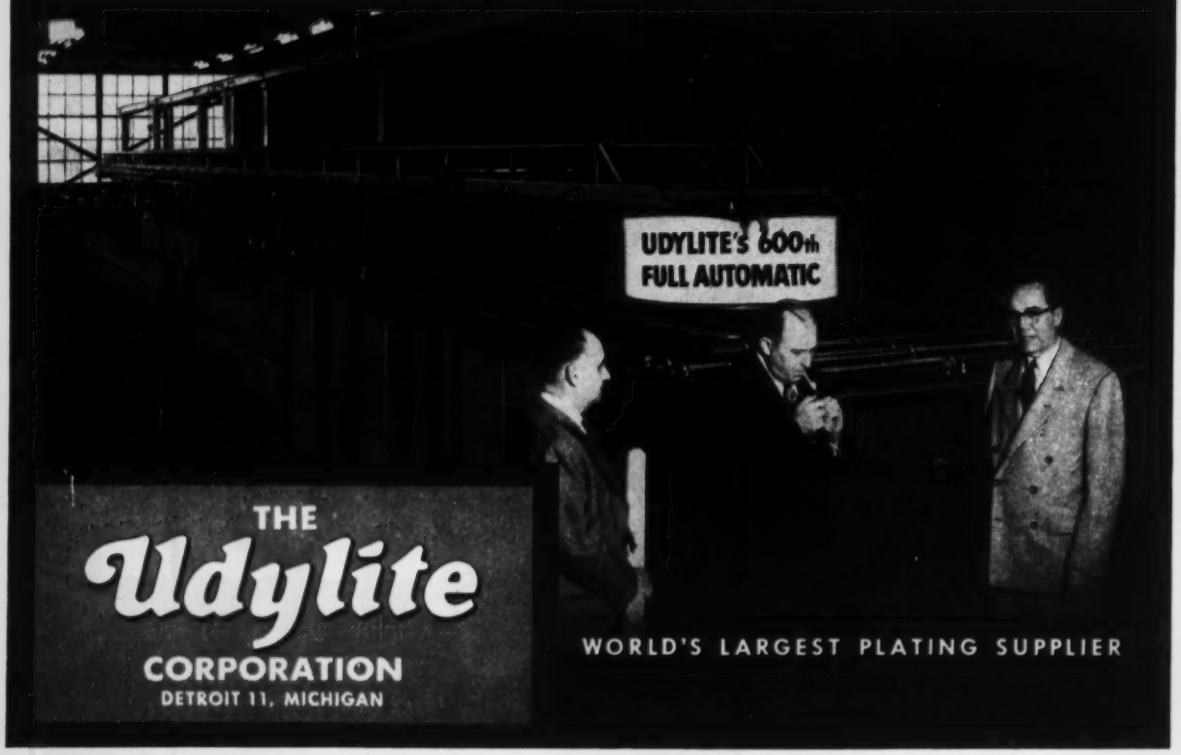
Udylite machines are being used today in plating hundreds of different products . . . from small telephone relays to bulky tubular furniture, and for almost as many different processes.

The Udylite Full Automatics engineered and built to suit the need have ranged in size from 20 feet to 500 feet in length. Udylite can furnish a machine for every plating or finishing problem.

If you have a metal finishing production problem, Udylite Full Automatic Equipment can help you.

Official inspection of Udylite's 600th Full Automatic, 100 feet long, built to copper, nickel, chrome plate 3,000 cigarette lighters per hour.

Write for the booklet "Udylite Automation in Plating"— the story of Udylite Full Automatics in industry today



ALLIS-CHALMERS GETS THE CEILING INTO THE PICTURE

. . . and steps up metal pouring speed 60%

At the Allis-Chalmers foundry in La Crosse, Wisconsin, Whiting Trambeam Overhead Systems do a faster job of handling the heavy work of charging, transferring and pouring. In addition to increasing the pouring speed Trambeam has helped to reduce costs, improve employee morale and eliminate traffic jams.

Have you considered the advantages of bringing *your* "ceiling" into the picture?

Trambeam monorail and crane systems are being used to clear floors for action for all types of industry . . . making materials handling faster, easier and safer . . . turning "overhead" into profit.

Write today for case study reports (M-27 foundry . . . M-26 steel warehouse . . . M-22 general manufacturing plant).

A few of the many other Whiting products include . . .

TRACKMOBILES

ELECTRIC FURNACES

HOISTS

OVERHEAD CRANES

TRAIN WASHERS

EVAPORATORS AND SPRAY DRYERS

WHITING

TRAMBEAM OVERHEAD HANDLING SYSTEMS

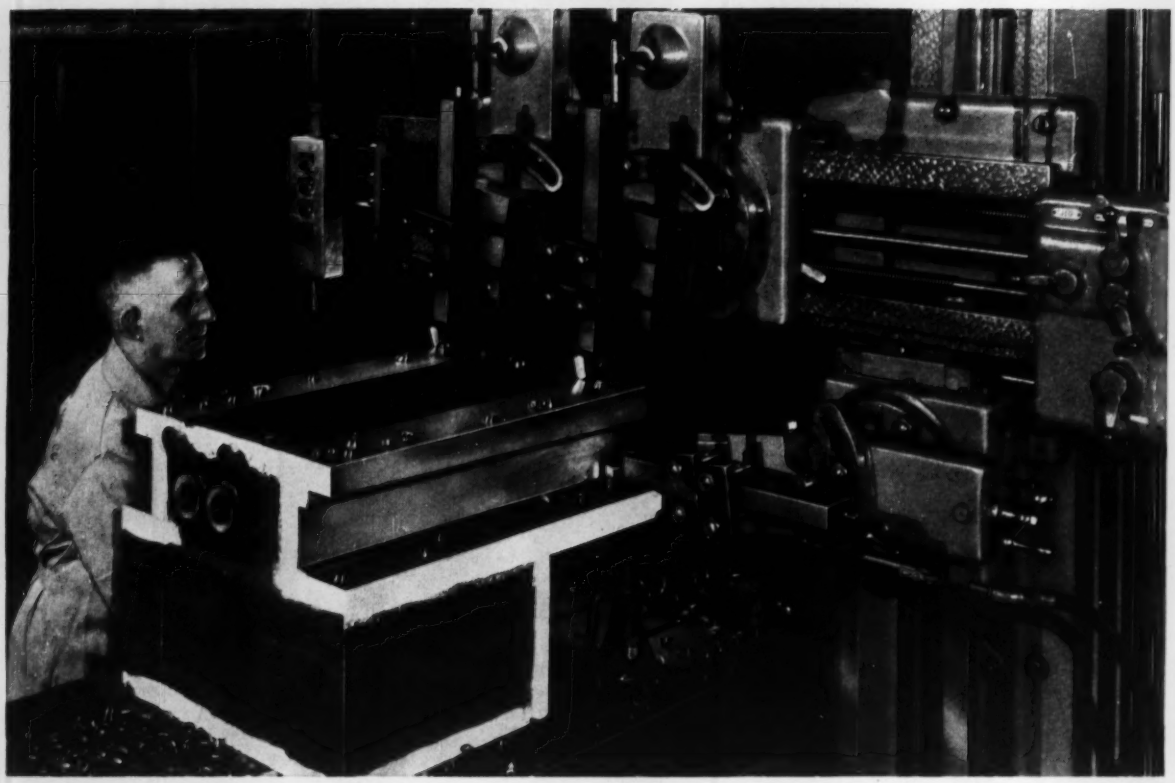
WHITING CORPORATION
15643 Lathrop Avenue, Harvey, Illinois

Whiting Corporation (Canada) Ltd.
P. O. Box 6, Station D, Toronto, Ontario

a cost cut with every stroke...

rockford hydraulic-driven

shaper·planers



an exclusive design for efficient production...

The Shaper-Planer is the only production machine tool manufactured exclusively for work which is too large for a shaper . . . and too small for economical production on a planer.

It features versatility and high cutting speeds, combined with hydraulic drive and feeds, in a price class that is hard to equal even by smaller, less flexible machines.

For planing and shaping efficiency in this class of work, get the complete story from your Rockford Machine Tool Co., representative, or write us direct for Bulletin 802.

Available in Openside, Double-Housing and Triple-Circuit Models

OUR 52nd YEAR

ROCKFORD MACHINE TOOL CO.

2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS

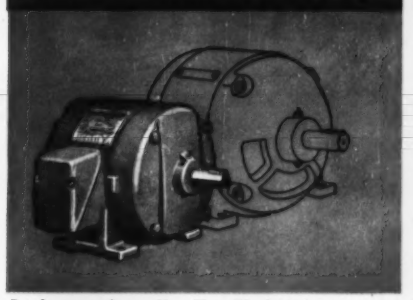
8 reasons why you should

MODERNIZE EQUIPMENT WITH TRI 55 CLAD MOTORS

REG. U.S. PAT. OFF.

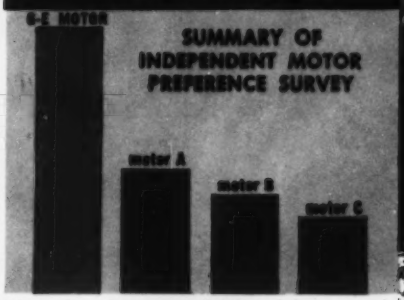
Plan now to modernize your equipment with the all-new General Electric Tri/Clad '55' motor, available now in many ratings; entire line of 1 to 30 hp a-c motors available soon. Contact your G-E Representative. General Electric Company, Section 648-6, Schenectady 5, N. Y.

MORE POWER PER POUND



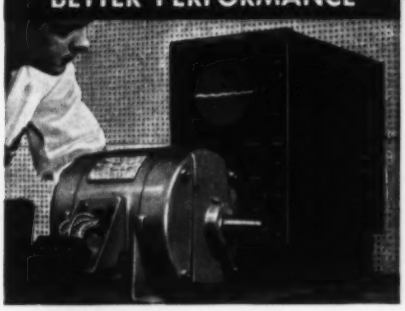
Lighter and smaller Tri/Clad '55' motors in new NEMA frame sizes and ratings save you space and weight, reduce handling costs.

BUYER PREFERENCE



You take advantage of a 2 to 1 buyer preference for the electric motors on your equipment when you buy or specify a G-E motor.

BETTER PERFORMANCE



Quieter operation, proved by sound-room tests, is typical of the many performance improvements in the new G-E Tri/Clad '55'.

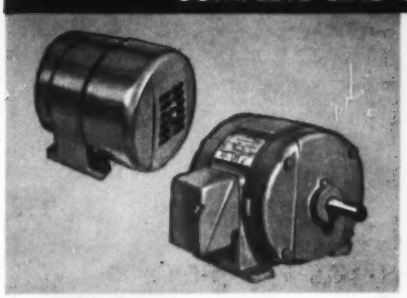
LONGER LIFE

A silicone Dri-film* coating makes insulation shed water—lengthens motor life. Polyester-film insulation is 8 times stronger.

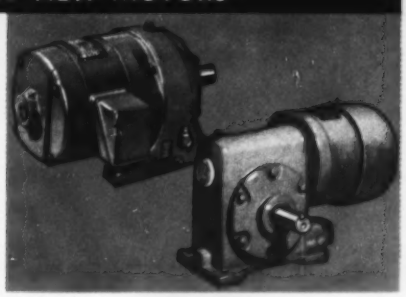
EASIER INSTALLATION

Perma-numbered leads are always instantly read even when wires are taped or clipped. Conduit box has plenty of knuckle room.

COMPLETE LINE OF NEW MOTORS



A complete line of new motors assures the right electrical drive for your machine. Write for Bulletin GEA-6013 on dripproof motors,



GEA-6012, on enclosed motors. For low speed jobs, G.E. offers a complete line of gear-motors. Write for Bulletin GEA-6027.

NEAR-BY SERVICE

CLASSIFIED
Electric Repair Service
—(Continued)
GENERAL ELECTRIC
SMALL MOTOR SERVICE STATION
Complete facilities for in and out-of-warranty repair or exchange of A-C and D-C motors and generators to 15 HP. Authorized distributor G-E motor renewal parts and G-E single-phase motors.
"WHERE TO CALL"
AUTHORIZED G-E MOTOR SERVICE
Street Address.....Phone No.

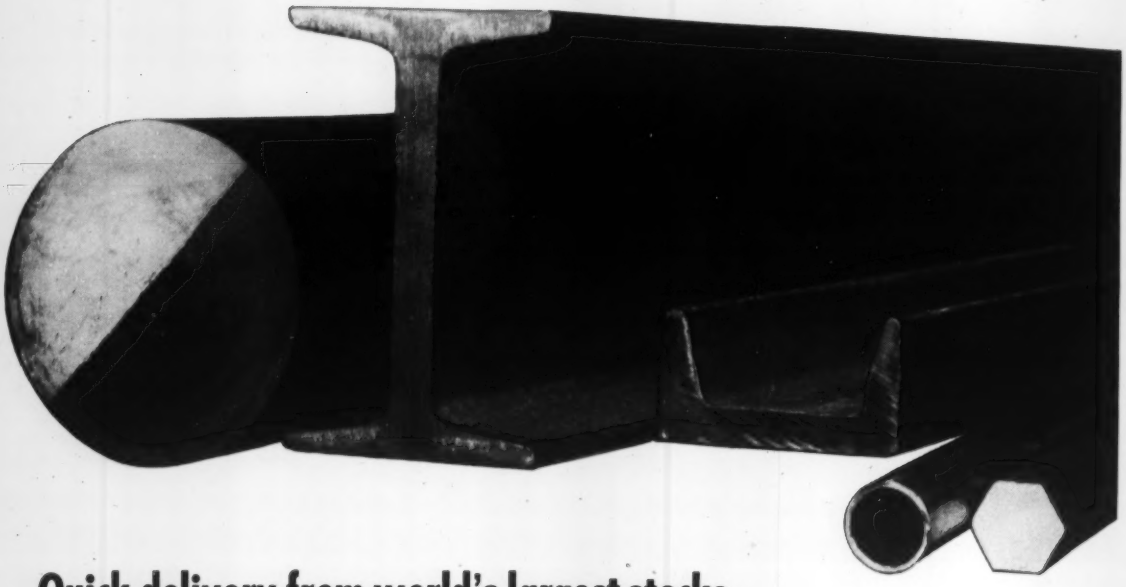
G-E service is as close as your telephone. Authorized motor service stations provide repair-facilities in all major trading areas.

*Reg. trade-mark of General Electric Co.

Progress is our most important product

GENERAL ELECTRIC

call Ryerson for steel carbon, alloy, stainless



Quick delivery from world's largest stocks

Whether you need a single piece or a truckload you can depend on prompt, personal service from your nearby Ryerson plant. So, for every kind of steel—when you need it—call Ryerson

RYERSON CERTIFIED STEELS

RYERSON STEEL

Principal products in stock: bars, structurals, plates, sheets, tubing, alloy & stainless steel, reinforcing, etc., also machinery & tools

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAND DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

STEEL

September 13, 1954

Metalworking Outlook

Nearly Back to Normal

The New England hurricane of Aug. 31 is bringing added business to metalworking, especially steel warehouses. Metalworking activities in the area are nearly back to normal, except where water-logged equipment is still out of service. Most serious damage was to electrical circuits and wires.

Square D and the UE

Square D Co. estimates it will be back in full production by about the end of this week at its Detroit plant where the left-wing United Electricalworkers have been striking since mid-June. Since Sept. 2 the company facility has been partially operated by workers who braved picket lines. As of last week more than 300 had shown up for work, nearly 100 of them new employees, 158 regular production jobholders and 100 supervisory persons. Normal employment is about 1200. Rep. Kit Clardy (Rep., Mich.) charges that the walkout has been Communist-inspired as a test to see how to tie up America's electrical equipment industry.

Labor Laws: No Action Soon

No new labor legislation is likely from the 84th Congress, believes Secretary of Labor James P. Mitchell. An "objective look" will be needed to determine changes that should be made in the labor law but this will not be possible in the near future because of "emotion, hysteria and bias" over the Taft-Hartley law, he says.

Scrap Exports Climb

You can expect iron and steel scrap exports to rise for the rest of 1954. Mounting West European steel production brings greater demand for scrap. U.S. exports were 221,275 net tons in the first quarter, 204,411 in the second. But licenses granted for third-quarter shipment aggregate more than 390,000 tons. Licenses granted for the fourth quarter amount to more than 500,000 tons. License applications for the first quarter next year also will be heavy.

No Agreement on Steel Marking

There's still no government-industry agreement on a marking standard to identify carbon and alloy steel products. Further study will be made. The Department of Defense is pushing the matter and has already worked out a system with aluminum producers. Like the steel industry, makers of copper and copper-base products still have not found a satisfactory sys-

Technical Outlook—p. 123 Market Outlook—p. 175

tem. The Air Force for some months has been favoring suppliers that mark their metal products.

"Real" Wages Up 6 Per Cent

"Real" earnings of factory workers have climbed 6 per cent since Korea. The average hourly rate was $1.45 in June, 1950, and it's now $1.81. Squeeze the inflation and higher taxes out of that 36-cent climb, and the gain is still a respectable 6 per cent. Prospects are that "real" wages will rise another percentage point or two over the next 12 months.

Love Without Marriage

Watch for more love-without-marriage business deals to come up as a parallel to the trend of outright company mergers. The most prominent such arrangement has been between Diamond T Motor Car Co. and International Harvester Co. The former will assemble some of the latter's special truck models, and Harvester will manufacture certain Diamond T truck components. Diamond T reveals it "has been invited to participate in two separate mergers with other truck manufacturers and has been offered the opportunity to buy several different truck companies. But none of these proposals has appeared advantageous."

Transfusion in Shipbuilding

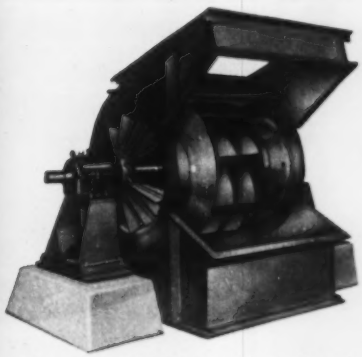
The U.S. will pump $173.6 million into the ailing shipbuilding industry that will also get $227.6 million in contracts from private shipowners. The transfusion is expected to give employment to more than 35,000 shipyard personnel. The program includes funds for construction of four passenger vessels and 19 tankers, conversion of four Liberty ships in an experimental program that may lead to conversion of many more, modification of four Mariner vessels at a cost of about $6 million and $12 million worth of ship repair work.

Straws in the Wind

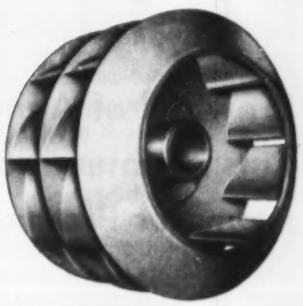
Quebec Metallurgical Industries Ltd. has formed Klukwan Iron Ore Corp. to develop and mine iron ore deposits in Alaska . . . Henry Ford II went on record in Paris as favoring public marketing of much of the 3 million shares of Ford Motor Co. stock held by the Ford Foundation . . . Hawaiian Pineapple Co. will build its own canmaking plant in Honolulu.

This Week in Metalworking

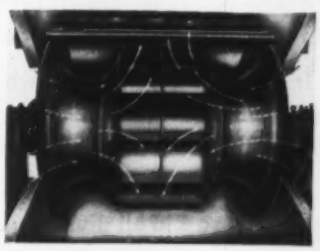
The brass industry is charting a new course for copper to win larger markets (p. 73) . . . Defense mobilization planning is changing and may mean new work for metalworking eventually (p. 75) . . . Taconite developments insure a domestic source of iron ore for generations to come (p. 76) . . . A rise in new orders means that ball bearings business will roll higher in the fourth quarter (p. 78) . . . Do you keep your executives in as good physical shape as your production equipment? (p. 79) . . . Makers of cast iron soil pipe expect to boost business with tighter standards (p. 84).



Heavy-duty Airfoil fan with section of housing removed to show wheel assembly. Air Volume is controlled by inlet vanes.



Each Airflow Blade is die-formed and reinforced to insure maximum rigidity.



Airflow into, through, and out of fan is completely streamlined. Result: maximum air output per horsepower input.

Aerodynamics applied to centrifugal fans:

Westinghouse Airfoil Blading Boosts Fan Efficiency to 92%

Quieter operation, too, for all heavy-duty applications

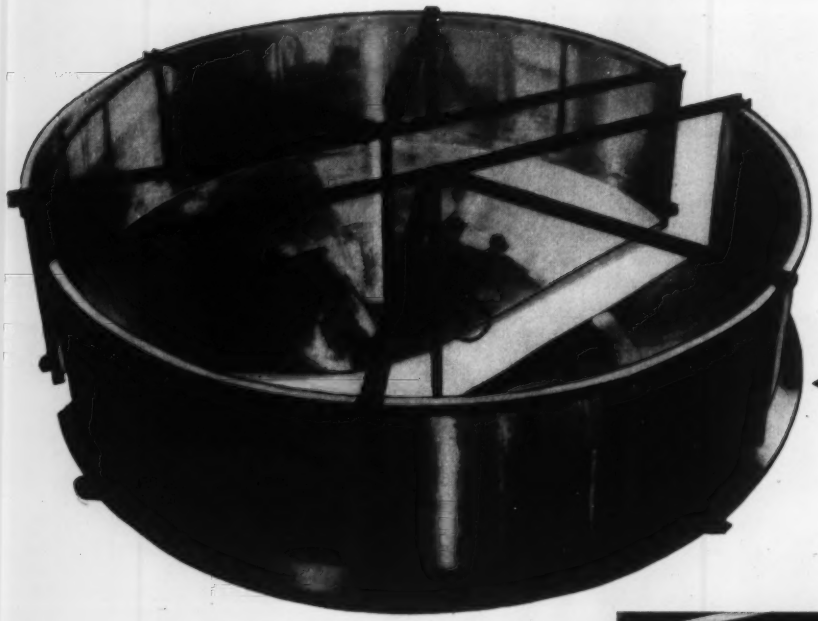
Westinghouse incorporates the airflow principle of an airfoil section into centrifugal fan wheel design to produce exceptionally high fan efficiencies! Performance proved, this Non-overloading Centrifugal Fan with Airfoil Blading reaches peak mechanical efficiencies of 92 percent . . . cuts noise level as much as 65 percent! Here's why: streamlined inlets that give smooth, full flow of air to the wheel . . . revolutionary Airfoil blades . . . improved housing that reduces turbulence. Benefit to you: a high-efficiency fan that pays for itself through yearly power savings.

This remarkable fan insures low operating cost and quiet operation in mechanical draft . . . high-velocity air conditioning systems . . . heavy-duty industrial applications . . . vehicular tunnel ventilation. For full information, contact your local Westinghouse-Sturtevant office, or write: Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Boston 36, Mass.

WESTINGHOUSE AIR HANDLING

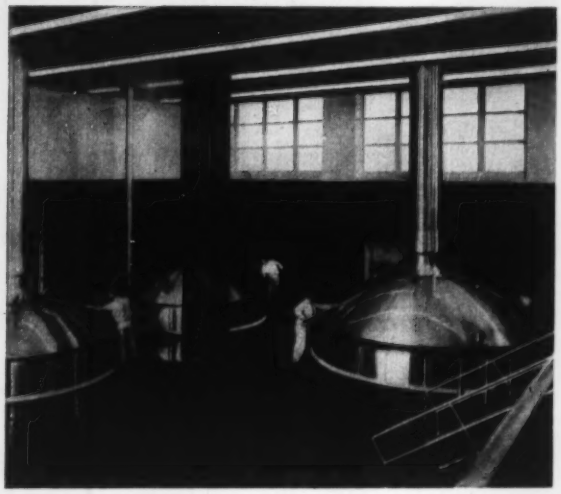
YOU CAN BE SURE ... IF IT'S Westinghouse

J-80420



75 Tons of Type 304 Stainless Steel were fabricated for the new Anheuser-Busch West Coast brewhall. Note size of this starting tank, by comparison with workman polishing it at plant of Nooter Corp., St. Louis, Mo.

New Method of Supporting Brewing Tanks, devised by Nooter engineers, provides superior stability and performance. Eliminating usual costly complicated under framing. Nooter suspended three from floor beams of the plant itself, and rested others on steel legs sunk deep into concrete beams in the floor.



All Stainless Steel

Brewhall of Anheuser-Busch Cuts Maintenance and Promotes Product Purity

The new Anheuser-Busch brewery in California's San Fernando Valley is a man-made beauty . . .

It's the nation's first brewhall built to an integrated design, with all equipment of lustrous chromium-nickel stainless steel.

Easy to clean and keep clean, it helps assure product purity in all divisions of the food and beverage industries. That is why Anheuser-Busch selected chromium-nickel stainless with its invaluable protection against corrosion, year-after-year. The smooth, silvery-white surface of the Type 304 stainless steel allows no harbor for contaminants, no chance for product impurity.

For other industries with different demands, it provides unusual strength at elevated temperatures, yet, in sub-zero service it possesses enviable toughness. It resists wear and has other useful properties. And, of course, it readily responds to all usual forms of fabrication, including welding.

Use chromium-nickel stainless to *improve your products.* Leading steel companies produce these austenitic alloys in all commercial forms. A list of sources of supply will be furnished on request.

EMBLEM OF INCO SERVICE

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N.Y.

Changing Markets

If there's any doubt whether the products you make will be selling tomorrow, this is the time for serious consideration.

Keep your eye on industrial developments that mean changing markets.

They include new materials and components that go into consumer items and the thousands of products of significance only to industry—new plastic-coated metals that can be formed without impairing the coating, higher strength steels, electrically-heated soaking pits for steel ingots, new presses and machine tools, fluid drives for industrial equipment, heat-treating equipment that imparts improved properties to steel and solenoid valves that replace motor-driven types.

These are only a few of the products emerging from men's minds, drafting rooms and production departments of thousands of metalworking companies. The list will lengthen as we move into the expanding but competitive economy of the late fifties and early sixties. Many agree that metalworking volume in 1960 can readily be 25 per cent larger than it is today. Sales of $113 billion in 1954 could be dwarfed by $140 billion in 1960, $156 billion in 1975.

What can you do about product development and diversification in this new era? You can check with your sales force. In its daily contacts, they know what your customers want, what they are buying from competitors. You can conduct market research to double-check on existing products and possible new ones. You can set up specific objectives for your research and engineering departments on product improvement and new products. You can see whether your production facilities are modern enough to make parts better and at lower cost. You can investigate developments in new materials. You can see if component parts can be purchased cheaper than you can make them. If your product is right, you can make certain it is being sold and promoted aggressively through your own sales force and distributors.

One of every two metalworking companies is planning the introduction of new products. Make sure yours will continue to sell in the expanding markets ahead. It could mean the difference between success or mere survival.

Irwin H. Such

EDITOR

MANAGEMENT AT WORK: In 1904, Thomas W. Pangborn, a young salesman for the Belleville Copper Rolling Mills, decided to work on an improved method for cleaning castings and metal parts. Manual cleaning with wire brushes, he figured, was far too tedious and

costly. So, he rented space for $10 a month in downtown New York and began development of his first sand blasting machine. At the end of the year, John C. Pangborn left Western Electric to join his brother.

The infant organization found the going rough for the first few years. Industry was slow to accept the first primitive sand blast machine that required hand filling and had no dust control. In 50 years the organization has grown to a giant yet benevolent corporation with 1000 employees housed in a modern plant in Hagerstown, Md. Unique in industrial history is the fact that after 50 years Tom still serves as president and continues in active management, with John as first vice president.

In the presence of notables from all over the nation on Sept. 1, employees unveiled a bronze plaque in front of the Pangborn plant. It will stand as a permanent tribute to the achievements of Brothers Tom and John.

OPERATION FORESIGHT: The *Keyvive* was more than a freighter when she docked at Cleveland on Sept. 4 with the first cargo of Labrador ore. She was a living tribute to all steelmen who have pledged their talents and resources to insure a continuing supply of domestic and foreign ore for future generations.

Coming at a time when there is a glut of ore, pioneering projects in Quebec-Labrador (STEEL, Aug. 9, p. 58), Venezuela, Liberia, Chile, Peru, etc., bespeak of great foresight.

Without prodding or assistance from the government, private capital expects to spend close to a billion dollars on the exploration of foreign supplies within the next 15 years.

The same interests will probably spend a like amount over the same period in the development of domestic supplies of taconite at the Mesabi range (p. 76).

These ventures are inspiring examples of free enterprise at its best.

FIRST IRONWORKS: On the banks of the Saugus river between Boston and Lynn, Mass., the relics of America's first ironworks (1646-1683) lay partly buried in the mud for 300 years.

The first unit was started in 1645 by John Winthrop, son of the first governor of the bay colony. It was a stone blast furnace with an interior shaped roughly like a lamp chimney to hold alternate layers of bog ore and charcoal charged from the top. A pair of waterwheel-driven bellows fanned the charcoal into blazing fury to reduce the ore to pig iron.

To Quincy Bent, retired vice president of the Bethlehem Steel Co., goes a big share of the credit for restoring the works. For, on Sept. 17, after four years of exploration, reconstruction and the expenditure of $1 million by the American Iron & Steel Institute, the works will be dedicated. It already is a mecca for traveling Americans and a reminder of the humble beginnings of the steel industry.

LOOKING UP: There are indications in many directions that the anticipated fall pickup in business will materialize.

The steelmaking rate last week dropped only 1 point to 63.5 per cent, even though it included a holiday. Scrap, usually a sensitive indicator, is on the rise. Some auto assembly lines are down for model changeover and the flow of materials and parts for 1955 cars will be swelling over the coming weeks. Earlier predictions of a 5.3-million-car year for 1954 appear to be holding up. Construction is still booming. Purchasing agents report a flurry of higher prices.

Most encouraging of all are the reports that individual and business morale have remained consistently high during the period of readjustment.

ATOMIC MARKETS: Many will recall that during World War II it was almost impossible to persuade the War Production Board to release stainless steel except on highest priorities. The mysterious disappearance of stainless steel and countless other materials and components finally was explained when the news leaked out about the Manhattan atomic bomb project.

The atom has provided metalworking with one of its biggest markets, one that is likely to get even bigger in the future. Breaking ground for the Duquesne Light Co.'s atomic power plant on Labor Day does not mean that coal and hydro installations are on the way out. Atomic power is still in the development stage.

Close to $1 billion will be spent in the next ten years in building prototype and pilot plants. A big share of the money will go to metalworking.

Argon gas being used as a backing agent replacing backing rings . . . Welding operations are fast and simple.

ELIMINATE Backing Rings

in Stainless Steel Piping with HELIARC Welding

Trade-Mark

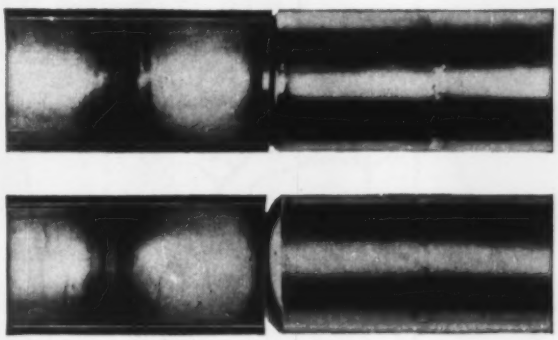
The combination of stainless steel pipe and HELIARC welding with argon gas backing produces a corrosion-resistant piping system—ideal for handling foods, fluid metals, corrosive liquids, high-pressure and high-temperature steam, and pharmaceutical products.

No backing rings—argon replaces the atmosphere in the section of pipe to be welded, and protects the weld bead from the underside as it is formed. This eliminates the need for metal backing rings.

New torch techniques allow the operator to control the size and shape of the penetration bead inside the pipe, while he is making the weld.

Smooth, sound joints—every time. HELIARC welding produces joints free from obstructions, notches, and crevices which hinder or trap flowing materials within the piping system. The penetration bead in the pipe is held within 1/32-in. of the pipe's normal inside diameter.

For the full story on argon-backed, stainless steel pipe fabrication, ask your local LINDE representative for the booklet, "Inert-Tungsten Arc Welding of Stainless Steel Piping," F-8463. In addition, he will be glad to give you complete information on how HELIARC welding cuts time and cost in many other applications. Start saving now—call him today.



Top—interior and exterior of completed welds without argon backing. Bottom—with argon backing, note the smooth, porosity-free, high quality welds.

Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

Offices in Other Principal Cities

In Canada: DOMINION OXYGEN COMPANY

Division of Union Carbide Canada Limited, Toronto

Linde Trade-Mark

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We work 184,000 hours a day to keep him happy

The man with this stamp carries a lot of weight at Inland. His job is to inspect your steel during each phase of its production. And if it's not what it ought to be, he's apt to give us a hard time. Because we realize he's only being tough to keep our customers happy, everyone at Inland works hard every day to keep *him* happy.

INLAND

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38 South Dearborn St. • Chicago 3, Ill.

SALES OFFICES: Chicago • Milwaukee • St. Paul Davenport • St. Louis • Kansas City • Indianapolis Detroit • New York

PRINCIPAL PRODUCTS: Sheets • Strip • Plates Structural Shapes • Bars • Tin Mill Products Rails and Track Accessories • Coal Chemicals

Brass Industry Charts Copper's Course for New, Larger Markets

(Usage in Selected Product Groups—thousands of pounds)

	COPPER			ALUMINUM		
	Avg. Qtr. 1947	First Qtr. 1953	Percent of change	Avg. Qtr. 1947	First Qtr. 1953	Percent of change
1. Machine shop products	5,440*	5,550	+ 2.0	10,819*	17,686	+ 63.5
2. Electrical equipment for internal combustion engines	18,892	26,266	+ 39.0	1,154	3,514	+204.5
3. Radio and radio products	6,861	15,970	+132.8	2,480	8,580	+246.0
4. Telegraph & telephone equipment	6,295	10,112	+ 60.6	770	1,514	+ 96.6
5. Electrical products, NEC	6,015*	3,890	- 35.3	145*	1,164	+702.8
6. Motor vehicles and parts	60,954	71,926	+ 18.0	21,166	38,508	+ 81.9
7. Hardware, NEC	12,262	16,344	+ 33.3	1,180	5,124	+334.2
8. Metal stampings, including automotive	21,909	12,678	- 42.1	32,282	50,588	+ 56.7
9. Lighting fixtures	5,624	5,082	- 9.6	2,480	4,358	+ 75.7
10. Wire products, NEC	7,869	5,752	- 26.9	765	2,058	+169.0
11. Bolts, nuts, washers & rivets	15,204	14,110	- 7.2	1,115	2,452	+119.9
12. Internal combustion engines excluding automotive and aircraft	7,150	3,810	- 46.7	3,379	15,658	+363.4
13. Construction and mining machinery	1,983	4,922	+148.2	160	1,328	+730.0
14. Metalworking machinery, NEC	2,832	3,330	+ 17.6	1,330	2,428	+ 82.6
15. Special industry machinery, NEC	3,228	2,406	- 25.5	989	1,394	+ 41.0
Total—selected groups	182,518	202,148	+ 10.8	80,214	156,354	+ 94.9
Grand Total—all groups	471,451	639,078	+ 35.6	230,501	430,220	+ 86.7

* Based on average quarter of 1949, not available for 1947.

Source: Department of Commerce, Business & Defense Services Administration

COPPER AND BRASS producers are hammering away old wrinkles and polishing up a new look to counter the inroads of competitive metals.

1. A program to find new uses and methods of working and handling their products. 2. More promotion, both in advertising and the dissemination of basic information to copper and brass users. 3. More emphasis on supplying demand through mining and scrap recovery operations.

The Why—Under the aegis of Copper & Brass Research Association, New York, the program started with a basic policy shift. Cast aside was the industry's theme, "Romantic Copper, the Age-Old Metal." Factors influencing the industry to take on new aggressiveness are no secret—copper and brass haven't matched the postwar growth of newer metals.

A case in point: Manufacturers' consumption of copper increased about 36 per cent between 1947 and 1953, but aluminum usage rocketed 87 per cent. A study of 15 selected product groups (see the table) shows the extent. In eight groups, copper usage increased in the period, but aluminum increased at a much greater rate. In seven groups copper use dipped while aluminum gained. The 15 groups in 1953 accounted for about 32 per cent of all copper consumption and 36 per cent of aluminum, compared with 40 per cent of copper and 35 per cent of aluminum in 1947.

Availability—Copper is in plentiful supply to meet any forseeable demand. "Mine production, net imports and scrap all show promise of substantial increases in both the short and long-term views," says William A. Meissner Jr., deputy director, Copper Division, Business & Defense Services Administration (see Nonferrous Metals, p. 178). Lower-grade ores (down to 0.8 per cent) are being recovered profitably, reserves are not diminishing. Eleven new mines and reopened projects will be in operation in the next three years. Research on the role of scrap shows that potentially 80 per cent of old scrap is recoverable (on an estimated 35-year cycle), a plus value to the metal's use.

Copper, with its many alloys, is fondly called the metal of invention by producers. Some new developments in which copper plays a significant role were outlined last week by R. C. Diehl, president, Chase Brass & Copper Co. Inc. and head of the association. Among them: Wave guide hardware cut from extruded alloy shapes, coaxial cable of copper tube and metal-to-glass seals using thin copper sections. In color television, a critical screen is now

made from thin cupro-nickel strip by etching a large number of fine holes.

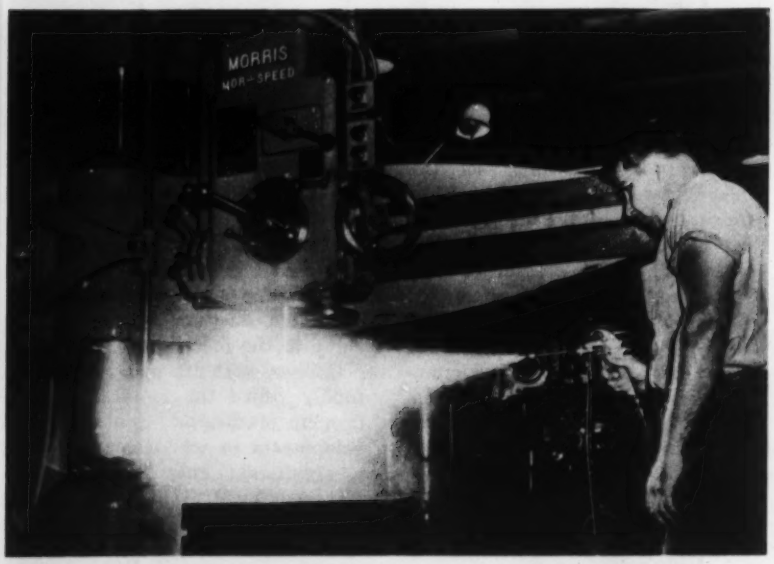
With the Atoms—Cyclotrons and betatrons gobble up large amounts of copper because of its high conductivity-to-volume ratio. Increasing use is now being made of the hydrobulging process for making hydraulic fittings; copper's ductility, pressure tightness and good corrosion resistance suit it for the job. Vacuum furnaces for melting titanium and zirconium require copper molds with exceptionally smooth inside surfaces, which can be kept cold to prevent wetting and attack by the molten metal at temperatures over 3000 degrees fahrenheit.

Capacity for precise etching has pushed the red metal's use in printed circuits for radio, television and electronics applications. Turbo-generator output is said to be increased 30 to 50 per cent by better heat dissipation; hollow windings of extruded interlocking brass shapes circulate cooling gases. Bronze alloys are now used in the housing of new single-ball self-aligning bearings. Hollow extrusions of architectural bronze are used for watch case parts. Tellurium-bearing hardenable alloy of special hard temper has proved the answer for an aircraft electrical connector requiring high conductivity, machineability, solderability and excellent spring properties. Chromium copper is an age-hardening alloy now used for aircraft generator commutator bars. Superfine-grain brasses which can be severely cold worked without losing lustrous surface, strength and stiffness are growing in popularity.

Outlook—These new applications demonstrate, says Mr. Diehl, that "copper and its alloys are definitely part of our industrial life—today and tomorrow."

Royal Aircraft Corp. Formed

Kearney & Trecker Corp., Milwaukee, organized Royal Aircraft Corp. as a wholly owned subsidiary to manufacture a new gull-wing, twin-engine, all-metal amphibian airplane. Airframe and wings will be made by Piaggio & Co. of Italy, while the motors, propellers, instruments, radios, wheels, brakes and other components will be made in the United States. Special facilities for assembly and distribution are being constructed in Milwaukee.



No 'Moth-Balling' for These Stand-By Machines

Machines at the Michoud Ordnance Plant in New Orleans, largest "stand-by" defense manufacturing installation in the United States, are kept in perfect operating condition between periodic runs by spraying with a heavy oil containing rust preventive properties. The huge tank engine plant is maintained on a stand-by basis for the Army by Chrysler Tank Engine Division, Chrysler Corp.

Government Leasing

Tools owned by government are leased under "limited use for free maintenance" policy

TWO MORE companies have won permission from Office of Defense Mobilization to lease government-owned equipment.

Approved were: 1. A Navy request to lease tools in the Kearney Reserve Shipyard, Kearney, N. J., to Crylon Steel Corp.; and 2. a General Services Administration lease of a 64-inch Bullard vertical turret lathe to Bryant Chucking Grinder Co.

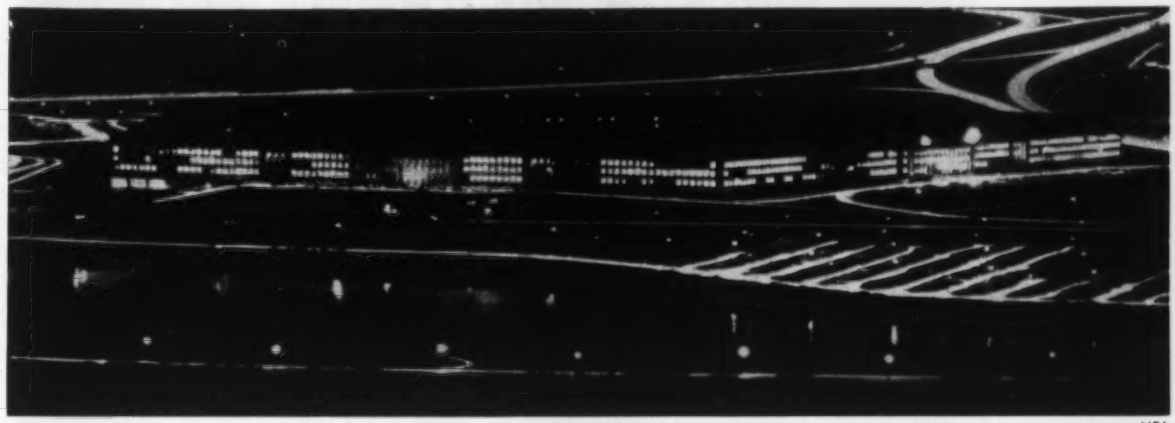
Mobilization Plans—Leasing of government-owned tools drew much fire from machine tool builders about a year ago when ODM formulated mobilization plans to keep idle defense tools in operating condition. Plans provided for leasing tools to industry, storing equipment in "package" form near the plant that would use it in emergencies and storing equipment at a central government warehouse.

ODM then set a policy of leasing tools for civilian use only in extraordinary cases. Leases to Crylon Steel and Bryant are for limited use in return for free equipment maintenance. The consideration is that tools are kept intact, and operation insures maintenance and a supply of skilled manpower.

Army Proposal—The Army has asked permission to lease equipment for producing earth-borer and pole-setter trucks to Highway Trailer Co. Under the Army proposal, the company would pay a nominal rental for limited use of the $185,000 equipment and maintain it. It would also maintain $304,000 worth of equipment for the government, which it would not use.

Pending, too, are GSA requests to lease 94 "elephant" machine tools to 47 machine tool builders. These tools—big planers, horizontal boring, milling and drilling machines—are essential to defense but have limited peacetime uses. Installing them in operating positions costs thousands of dollars. Dismantling and storing them would add more costs to taxpayers.

Pentagon Works Overtime on Defense; Industry May Later



NEA

DECISIONS being made in the Pentagon soon will be felt in all corners of metalworking.

Reverberations — With lack of enthusiasm over the Southeast Asia Treaty Organization at Manila, re-examination of all strategic planning has gone into high gear at the Pentagon. Defense Secretary Charles E. Wilson has canceled out an earlier decision to reduce armed services personnel from the current 3.3 million to about 3 million by June 30, 1956. Practically all other plans for retrenchment have been suspended, particularly those involving weapons strength. Procurement is to be stepped up instead of reduced.

A definite forecast of how fast those obligations will be increased is lacking; STEEL was able to learn, however, that "obligations to carry on the military functions in fiscal 1955 will be considerably above those of fiscal 1954, and this increase will be reflected in the months immediately ahead."

Speaking in Billions—It's unlikely that defense obligations in the present fiscal year will approach those of peak rearmament years. Obligations of the Defense department were $28 billion in fiscal 1954, $35.7 billion in fiscal 1953 and $56.9 billion in fiscal 1952. To regain the peak, fiscal 1955 obligations would have to be more than doubled over 1954—and an increase of such proportions is not likely.

As for Defense department spending, there will be no substantial change from the previous estimates for fiscal 1955. That's because of the lag between ordering goods and taking delivery and paying for them. Defense department spending should be about $37.5 billion in fiscal 1955, compared with $40.5 billion in fiscal 1954, $43.9 billion in fiscal 1953 and $38.8 billion in fiscal 1952.

Production Planning—As part of the long look being taken at defense preparations, the Production Allocation Plan is under reexamination. Pentagonians believe that some of the present plans with individual companies are obsolete and require revision.

The whole matter is under T. P. Pike, assistant secretary of defense for supply & logistics. Interested metalworking executives can avoid walking miles in the Pentagon by contacting J. Lewis Powell, program co-ordinator for the Production Allocation Plan. He works in office 2E829 at the Pentagon and can be reached by phone at LIberty 5-6700, Ext. 56969.

For Contractors Only—All defense contractors will be interested in the progress of the rewriting of the Armed Services Procurement Regulation. It's hoped that editing of Section XV on cost principles, under way for two years, will be completed in December. The Defense department will not publicize changes it contemplates.

Contractors and subcontractors who need help in terminating defense contracts can get it from a book, *Contract Termination Guide*, off the press in a few weeks. Free copies can be obtained from its sponsor, the Chamber of Commerce of the U. S., in Washington.

BDSA Studies Bomb Protection

In case of enemy bombing attack, how will continuity of production and management be assured in critical industries? Commerce department's Business & Defense Services Administration will seek answers from conferences with top management of companies high on the Federal Critical Industrial Facilities List (see STEEL, July 26, p. 52).

The conferences are on an individual-company basis and deal with management's responsibilities toward safeguarding their plant and personnel. About 700 to 1000 firms will be called in. Identities will not be disclosed.

As a by-product of the talks, BDSA expects to establish a pattern of management responsibilities, so details of big-company plans can be given to industry generally.

Steel Industry Insures Its Future—

Half-billion-dollar investment to prolong Mesabi range for generations. Concentrate shipments will reach 30 million tons annually by 1970, allay concern about dwindling supplies of direct-shipping ores

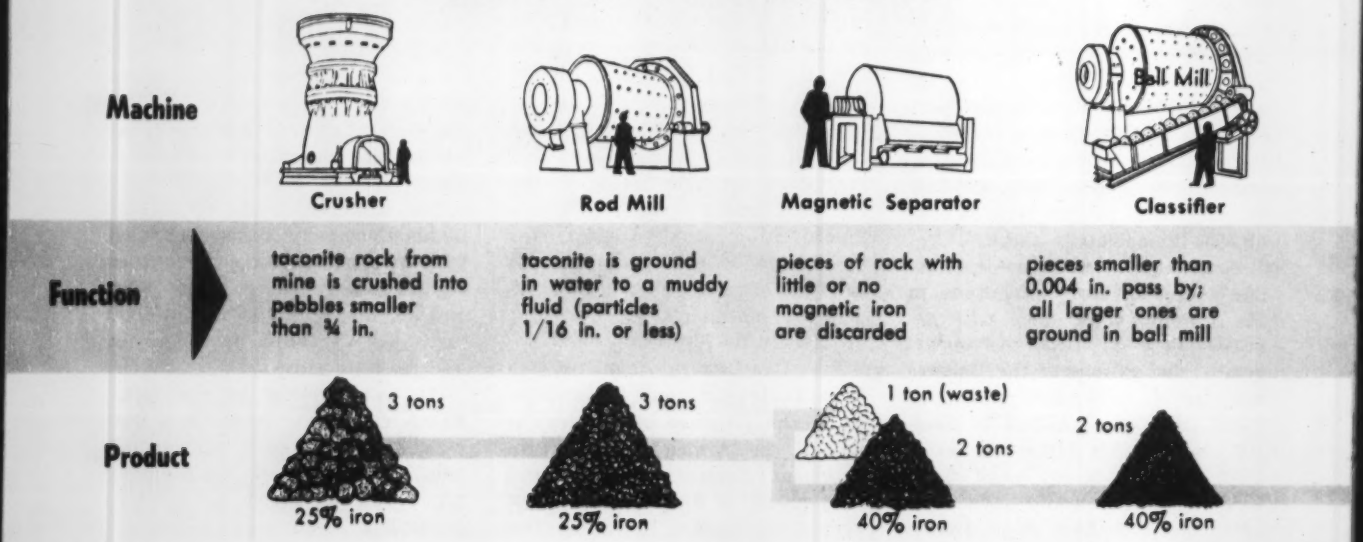
Five-foot chunks of taconite blasted from solid rock are ready to move to crusher, first stage in processing into usable blast furnace material

STEEL producers are taking out a half-billion-dollar insurance policy in northern Minnesota. In large print you'll find promises to extend the life of the Mesabi ore range and guarantee a domestic source for iron for generations to come.

Three projects are under way to mine taconite (extremely hard rock bearing about 25 per cent iron) and process it into iron ore suitable for blast furnace use. Small tonnages of the product—pellets containing more than 60 per cent iron—already are flowing to lower lake blast furnaces. Within three years yearly shipments will rise to 10 million tons. By 1970, the movement may exceed 30 million tons.

Countering Depletion—The taconite ventures are one of the steel industry's answers to the dwindling supplies of direct-shipping ores. Another is the development of foreign sources for rich ores—Labra-

magnetite grains freed from unwanted minerals



with Taconite

Finished pellets, bearing 62.5 per cent iron, are ready for shipment to blast furnaces

dor-Quebec, Venezuela, Liberia, Chile, Peru and others. The same companies backing the foreign ore development are behind the taconite projects.

Who's Who—Reserve Mining Co., owned jointly by Republic and Armco, is constructing a 3¾-million-ton plant at Silver Bay, Minn. It will be completed in 1957. Reserve put a 300,000-ton plant in operation in 1952 at Babbitt, Minn., the location of its taconite mine. Ultimately, the project will be enlarged to produce 10 million tons.

Erie Mining Co., owned by Bethlehem (45 per cent), Youngstown Sheet & Tube (35 per cent), Interlake Iron (10 per cent) and Steel Co. of Canada (10 per cent), is operating a small plant at Aurora, Minn. Construction is under way on a new concentration plant capable of producing more than 7 million tons a year. Erie's ultimate production is expected to reach 10 million tons annually.

U. S. Steel's Oliver Mining Co. is going ahead with experimental work at Mountain Iron and Virginia. U. S. Steel expects to be ready for commercial development by 1959.

How It's Done — Early this month, Reserve Mining showed newsmen how taconite is mined and processed. The company owns a vast deposit of magnetic taconite at the eastern end of Mesabi range.

Pierced by Flame—The ore body is stripped and 40-foot-deep blast holes are burned into the rock by a jet-piercing machine. Explosives blast out benches 35 feet in height.

The rock is reduced to first-sized chunks in a two-stage crushing plant at Babbitt. Then it is shipped 48 miles by rail to the company's new concentrating plant at Silver Bay on Lake Superior.

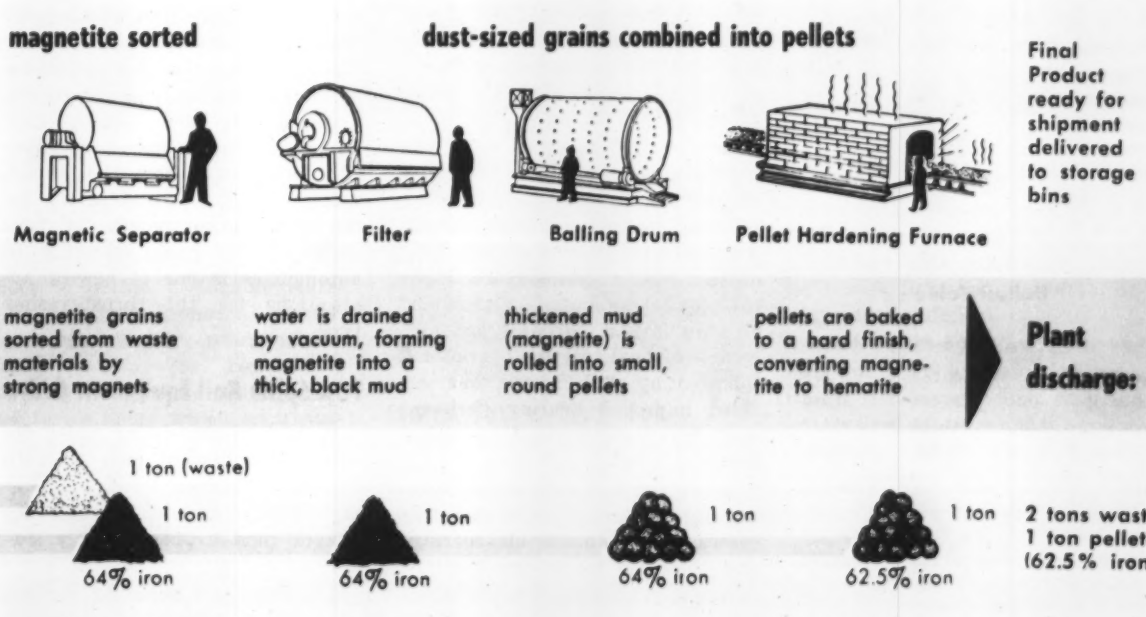
At Silver Bay the rock is crushed to ¾-inch pieces, then fed into rod mills containing a large number of heavy (650 pound) steel bars. They tumble as the mill turns and crush the rock to course sand size. Water is added here and in succeeding operations to facilitate crushing.

Magnetically Separated—Material then is passed through magnetic separators that pick up the iron-bearing material, discard the non-magnetic.

Magnetic material goes to ball mills and is crushed to minus 325 mesh, then through more magnetic separators.

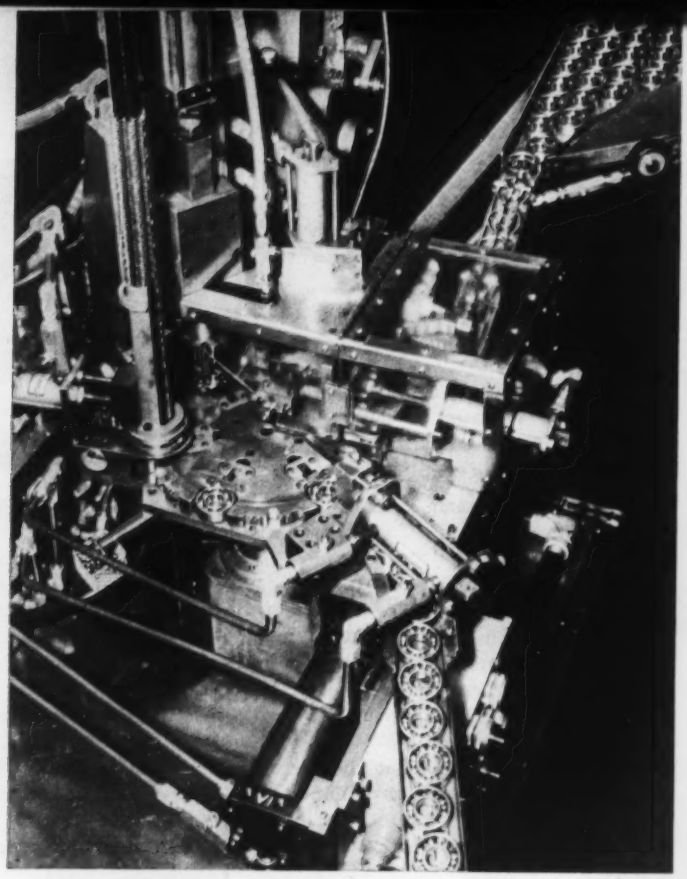
The final concentrate, about as fine as face powder, and of mud-pie consistency, goes into a huge revolving drum, where it is shaped into pellets.

After firing in a furnace to dry and harden, pellets are ready for shipment.



New Orders Signal Fourth-Quarter Gains In Ball Bearing Sales

Sales for first half, 1954, are down 18 per cent from last year. New developments brighten outlook for market expansion



Assembly of ball bearings at New Departure is automatic. Matched rings are fed to the dial press, balls are loaded, separator is positioned and staked, and bearing ejected into flow of material

NEW ORDERS are keeping the ball bearing industry rolling.

After experiencing a sales drop of about 18 per cent in the first half, 1954, compared to last year, bearing makers report a fourth-quarter increase is definite and that 1954 over-all should end less than 15 per cent behind 1953. Sales for all antifriction bearings are about $500 million annually, with ball bearings accounting for half the market.

The Import-Export Picture for BALL BEARINGS AND PARTS Dollar Value

1954	*Exports	Imports
April	1,220,052	27,378
March	588,592	31,240
February	943,688	35,017
January	776,663	60,886
1953	10,374,165	1,089,324
1952	13,437,716	1,453,539
1951	10,951,462	1,541,301
1950	7,301,254	156,496

* Including balls.
Source: U. S. Department of Commerce.

Strength — Showing strength as ball bearing markets are office machinery, automotive equipment, instruments and construction machinery. Increased sales to the electronics and guided missiles industries further expand the potential.

New developments and improvements in ball bearings are broadening the product's application, officials at New Departure Division of General Motors Corp. state. They cite these within the past year:

What's New—1. Use of vacuum melted steels to increase bearing life; 2. use of synthetic rubber compounds for bearing seals, permitting higher temperature applications; 3. ring and ball dimensional stabilization through accurate control of heat treating operations, followed by deep freeze, has enabled improved bearing performance for predetermined operating temperatures.

Vying for the antifriction bearing markets are about 60 manufacturers. Thirty make all bearings and about 25 make ball bearings exclusively. Exports (see the table) account for less than 5 per cent of domestic sales. Imports have little impact on the industry, with shipments coming mainly from Sweden and West Germany.

Major Types — Most widely used ball bearing in industry is the single row radial type used in electric motors, auto front wheels, gear boxes and similar applications. The double row bearing is gaining in use because of its space-saving features. The self-aligning type bearing is finding wide use in textile equipment, and the thrust washer bearing is best suited for low or moderate speeds and pure thrust loads. Power steering in automobiles is one of newest applications for the thrust-washer type.

FOA Splits Rail Equipment Order

A multimillion-dollar order for railroad equipment will be split fifty-fifty between U. S. and foreign producers even though the latters' bids are considerably lower.

The move was made by Foreign

Operations Administration, which is buying the equipment for India, because of generally depressed conditions in the domestic industry.

FOA Chief Harold Stassen estimates that the decision will add about $7 million to the planned cost of $20 million. The order includes 100 locomotives and 5000 cars. For the locomotives, Japanese Rolling Stock Export Co. was low bidder with $81,470 each. The only American bidder, Baldwin-Lima-Hamilton Corp., Philadelphia, asked $178,200 each. Both will get an order for fifty. Of the 5000 cars, half will be built by domestic firms, half by firms in Japan, United Kingdom and possibly Italy.

Mr. Stassen said that the decision to split the business will not set a pattern in future procurement. If the U. S. economy picks up, he said, we will be back on a more strictly world-wide competitive basis on bids.

Though Baldwin-Lima-Hamilton had received no official notice of the order, James F. Connaughton, vice president, said that if awarded, it would mean a considerable amount of work for men in the Chester (Pa.) area. The firm's declining backlog, too, would be helped. As of June 30, it was $68.7 million compared with $194.5 million a year ago.

AEC Readies New Rules

Atomic Energy Commission is sifting through the new Atomic Energy Act and will soon prepare regulations and policies for its administration.

They will cover: Terms under which private companies will be granted licenses to construct and operate reactors; terms under which the government would allow them to obtain fissionable materials for their operation; regulations concerning the patent article that provides for compulsory licensing of patents until 1959; and terms under which such government units as the TVA will sell atomic power.

No applications for licenses to install reactors have been received from private interests under the new law.

Keep Executives Shipshape, Too

Cleveland survey shows how 18 companies handle physical examination plans for executives. Average cost per man is $55 annually

"MAINTENANCE on our equipment pays off. Why isn't it just as important for us to keep in good shape?"

That's the comment of a Cleveland executive who's enthusiastic about his company's plan for the regular physical examination of executives. More companies are showing interest in such programs. Associated Industries of Cleveland checked the programs of 18 member companies to see how they were operated.

The Cost—AIC found the average cost per man for physical examinations for executives is about $55 annually. In eight of the 18 companies it is a compulsory examination; in 15 the physicals are given annually. All 18 pay for exams.

Greatest differences in the plans were in the men covered. The range spread from all employees to the executive staff only.

By Whom—Examinations by six companies are given by the company doctor, five leave the selection to the executive and the remainder have arrangements with clinics for examinations or provide lists of selected doctors for the executive to choose from.

A big factor in the cost and effectiveness of these programs is the frequency of the examinations and how the reports are handled. While most companies had the annual plans, one of the most interesting was that of the company which based frequency of examination upon the individual's condition. One varied frequency with age: Under 40 every two years, between 50 and 60 each year, and 60 to 65 twice a year.

Use of Reports—In handling examination reports, seven companies state that the executive only receives his report. Other companies require reports also for the executive's personal physician, the company president and/or other key personnel. Ten of the companies report that when serious conditions are found the executive is advised to have the condition corrected. Other companies have no policy regarding corrective steps. Most companies leave the cost of treatment up to the executive.

Examination programs for executives not only help keep the men in physical trim, but serve as a guide point in training executive assistants where the load is too heavy. Another factor is that it often eliminates the fears of an executive that he is "sick"; once he knows he's not, he often becomes more efficient.

Some Results—How does the program work out in actual practice? Here's what one company experienced in an examination: Ten men who thought they had heart trouble found out they did not, some 20 found that they did not have ulcers, another 15 who needed operations hadn't been aware of it until their examination.

Wide World

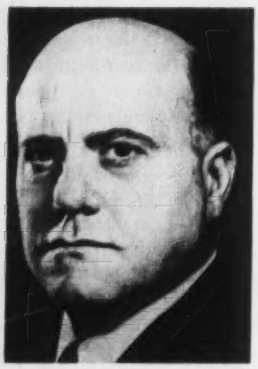
Hand for a Hot Job

A technician adjusts the mechanical hand inside a "hot cell" at Atomic Energy Commission's national reactor testing station in Idaho. The device, used to manipulate radioactive samples, is controlled by an operator who remains safely outside the cell

By E. C. KREUTZBERG, Washington Editor

NEA

Senator Martin: "Can the Renegotiation Board find profits on government contracts to be excessive merely because of the volume of defense business?"



NEA

Senator Milliken (chairman, Senate Finance Committee): "The board should go slow with that kind of reasoning."

Renegotiation: Extended Life but Tempered Application

HOW big does a defense business have to be before the Renegotiation Board can assume excessive profits?

The stamp of approval or disapproval should hinge upon the facts in each case, Congress practically told the Renegotiation Board, proposing: A large volume of defense business should no longer be considered as tantamount to evidence of excessive profits.

That came out clearly in the above exchange between Senators Edward Martin (Rep., Pa.) and Eugene D. Milliken (Rep., Colo.) in debate on the Renegotiation Act.

Extremely Hopeful—In fact, expressions by senators that renegotiation should not apply to business dealings with the government except in *abnormal* concentrations of defense work led to hopes that this may be the last extension of the Renegotiation Act. Here's the outline of the latest extension of the bill as passed by Congress:

Extended Through '54 . . .

1. It extends the authority to renegotiation of defense contractors' and subcontractors' receipts and accruals through Dec. 31, 1954.

Some Companies Let Out . . .

2. It exempts many companies from renegotiation by increasing the renegotiable minimum from $250,000 to $500,000 with respect to fiscal years ending on or after June 30, 1953.

Going on Relief . . .

3. The act extends the relief (formerly enjoyed with respect to machine tools and other durable equipment bought by contractors) to durable equipment procured under direct contracts with the government. For example, if the government purchases for its own account a new $100,000 machine tool having an estimated life of 20 years, the portion of the profits subject to renegotiation is 25 per cent. That 25 per cent is the proportion which five years, arbitrarily recognized as the length of the defense tooling period, bears to the estimated life of 20 years.

This relief applies only to new durable equipment that has peacetime and defense production use. It does not apply to durable equipment that has no peacetime use.

Extension of this exemption to durable equipment bought by the government applies only to fiscal years ending on or after June 30, 1953. Senators Martin and Prescott Bush (Rep., Conn.) tried vainly to make this change retroactive to Mar. 23, 1951, when the Renegotiation Act first became effective.

Senator Milliken turned the proposal aside. First, because most of the renegotiation on 1951 and 1952 transactions was completed; and, second, because of the fear that such an amendment might kill the bill in the adjournment rush.

Potpourri of Provisions . . .

4. The act, as extended, provides mandatory exemption of standard commercial articles, "unless the board makes specific finding that competitive conditions affecting the sale of such articles were such as not to protect the government from excessive profits." This amendment applies to transactions after Dec. 31, 1953, and the term "standard commercial articles" includes "any material, part, assembly, machine, equipment or other personal property."

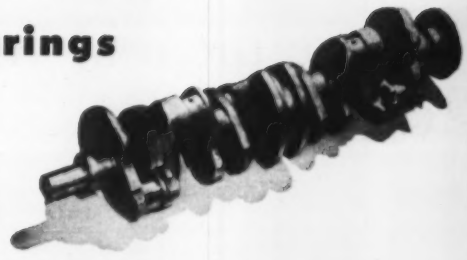
what's new?

NO. 28 OF A SERIES.

MULTI-PURPOSE: 10/HR.

flamatic hardens crankshaft bearings

10/hr. to 70/hr.



SINGLE-PURPOSE: 70/HR.

It's no wonder that the automotive industry turns to **flamatics** for selective heating precision. One of the many reasons is the automatic **flamatic** which hardens all 9 main and pin bearing diameters of a crankshaft in one operation. Designed for one size and type of workpiece, this machine averages 70 units/hr. Another reason is the **flamatic** shown above, which provides the flexibility required for small lot production runs or development work on a variety of crankshafts. Interchangeable flame heads, adjustable flame head holders, and adjustable tailstock make it easy to change from one size of crankshaft to another. Average production: 10 units/hr.

Single- or multi-purpose **flamatics** have met production requirements on many other parts—gears, spindles, cams, pliers, etc. More reasons for specifying **flamatic** are described in new Flamatic Catalog, Publication No. M-1861.

CINCINNATI **flamatic**

PROCESS MACHINERY DIVISION
THE CINCINNATI MILLING MACHINE CO.
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How many pension-plan experts are there in your company?

WORKING out the details of an employee pension plan is a big job. It's involved and time-consuming—even when it's handled by specialists who do nothing else. So imagine how difficult, how demanding a task it can be for operating executives in your company, however able they may be.

That's one of the reasons so many firms turn the problem of designing, maintaining and guaranteeing pension plans over to The Travelers.

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The cost, beyond the payments to the fund itself? Only service expenses—which are as low as experienced specialists can make them.

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YOU WILL BE WELL SERVED BY

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INSURANCE COMPANY, HARTFORD 15, CONNECTICUT

Porsche: Production Paradox

Made chiefly by hand is Germany's Porsche auto

MOSTLY HANDMADE in a mass-production age. That's one of the chief distinctions of the Porsche automobile, which is built in Stuttgart-Zuffenhausen, Germany.

The cars come in three models that differ only in engine size —40, 55 or 70 horsepower, with top speeds ranging from 87 to 109 miles per hour. But, hold onto your mass-produced hats: The price tags on the three models read $2750, $3050 and $3300.

No Fringe on Top—All models have one-piece bodies. Ingeniously, the motor in the rear leaves space for the gas tank up front under the hood. Luggage is stowed behind the seats, of which there are two. Busy workmen can turn out 150 to 200 cars a month.

Worker "signs" engine he built

Wide World

The Porsche plant's only assembly line is at left

Soil Pipe: Lifting Sales Via Higher Standards

BEAT THE COMPETITION with rigid quality standards, interchangeability and protection for a producer's reputation.

That's the strategy the $100-million cast iron soil pipe industry takes to meet the competition of asbestos, cement and bituminized fiber.

First Step—The Cast Iron Soil Pipe Institute, Washington, representing over 80 per cent of the industry, set up regulations that standardize soil pipe and fittings into two weights (service and extra-heavy). Four were used in the past. Specified weights, dimensions, patterns and testing procedures must conform before the institute's interlocking "C. I." seal is applied.

Soil pipe goes into disposal systems, including waste, vent and sewage lines inside a building and the sewer drain outside. Last year 671,520 tons of these goods were produced by the industry, a good part of which is centered in Alabama. Sales volume last year hit $100 million; in the first half of 1954 sales were up 10 per cent, while nonmetallic pipe sales were reported off 10 per cent.

The Cause—Behind the industry's move, which will require extensive foundry pattern changes, lies this story. At one time most manufacturers did a regional business. Standardization wasn't of great importance. After World War II, new producers started operations, some of whom competed for business strictly on a price basis.

To conserve materials and cut costs, they reduced fitting lengths. This hampered the job of estimating pipe runs and increased installation costs. Some newcomers even built their patterns from competitors' products without considering tolerances and casting shrinkage. Sand holes and improper meshing at joints were frequent. Often equipment and unskilled labor employed didn't permit adequate inspection of materials and finished products. These substandard products were giving the industry a black eye. Too, with marketing areas of manufacturers overlapping more, interchangeability and uniformity in dimensions and tolerances took on new importance.

Support—Standardization (specs are in the Commerce department's Commercial Standard 188-53 for service weight pipe and fittings; in Federal Standard Stock Catalog WW-P-401, Section 4, Part 5 for extra-heavy weight), has the backing of the National Association of Plumbing Contractors, American Society of Sanitary Engineering, plumbing wholesalers, engineers and architects.

Contractors and wholesalers are expected to benefit by carrying only two weights in stock, manufacturers by concentrating production on fewer sizes. "Many member companies are already shipping soil pipe and fittings meeting the new standards and carrying the C.I. seal", says Homer E. Robertson, the institute's executive vice president. "Final success of the program depends on whether homeowners, plumbing contractors and inspectors, architects and engineers request cast iron soil pipe and fittings with the C.I. seal."

More Uranium Facilities

A $40-million expansion of uranium-processing facilities in the St. Louis area is tentatively planned by the Atomic Energy Commission.

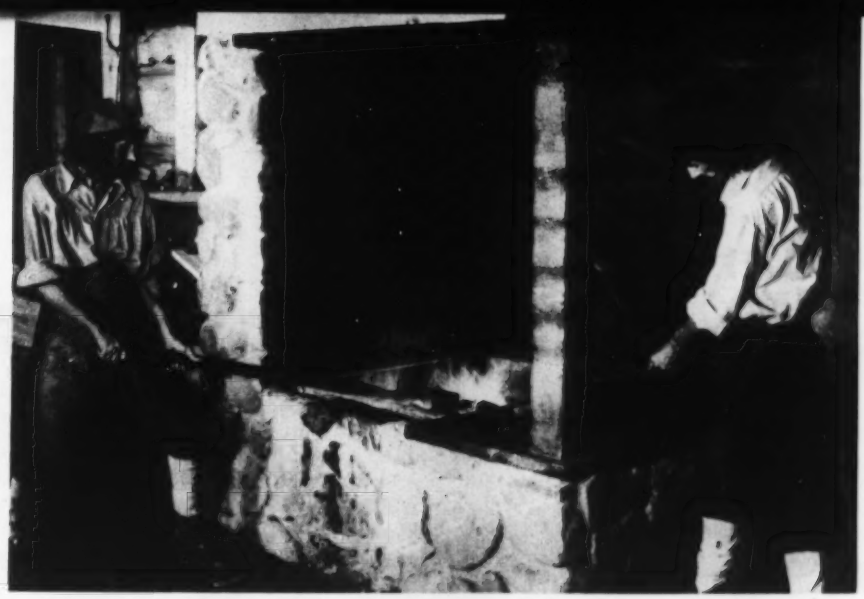
If plans jell, AEC may contract with Mallinckrodt Chemical Works, St. Louis, to operate the facility. Among sites being considered is Weldon Springs, Mo., the former location of an ordnance plant.

Hourly Wages at New High

July was a banner month for workers in the iron and steel industry. As a result of the new wage scale agreed upon in June, their average hourly wage hit a new high of $2.368.

The increase is 5.3 cents an hour over the June average, reports the American Iron & Steel Institute. Compared with the wage rate in July, 1953, the raise was 5.8 cents.

Employment in the entire industry was estimated at 607,600 in July, compared with 608,900 in June and a monthly average of 619,100 in the first seven months of 1954. Estimated monthly payroll of the industry was $232,796,000 in July, against $236,406,000 in June, bringing the total in seven months to $1.67 billion.



SAUGUS . . . America's First Ironworks

Restoration Is Shrine to All Metalworking

NOW YOU can see the birthplace of metalworking in America much as it looked 300 years ago.

In Saugus, Mass., the first ironworks in America (1646-1683) to produce iron successfully in quantity has been restored. The Saugus Ironworks (known as Hammersmith in Colonial days) will be dedicated Sept. 17. Eleven years of effort (supplied largely by the First Ironworks Association) and more than $1 million (the American Iron & Steel Institute gave much of it) have gone into the faithful reproduction.

What's Up? — Sections of the first ironworks restored include the blast furnace, the forge, the rolling and slitting mill and the wharf that was used for boat shipment of Saugus iron. Already put back into shape before the current program started was the ironmaster's house.

The restoration does more than give antiquarians something to talk about. It stands as a symbol of the spirit that produced not only Saugus but the modern American metalworking industry. Here, in the American wilderness, iron was produced by the best methods used in England and on the Continent. Here was built a combined rolling and slitting mill at a time when there weren't more than a dozen of them in existence.

Historical Firsts — The history of the Saugus Ironworks includes the first English-American patent on a machine invention, granted to Joseph Jenks, skilled workman of the ironworks, and the first use of a dense igneous rock for fluxing. The rock was "Nahant Rock Ore," available locally where the usual fluxes were not, and its use was a major technological innovation, bespeaking the American willingness to improvise in order to improve.

The Saugus works produced cast iron from bog ore and wrought iron by hammering out impurities from cast iron "sows" and "pigs." The structure of the cast iron produced at Saugus would be nearest the gray iron castings of today. Chemically, though, the Saugus product would be lower in manganese and silicon and higher in phosphorus than modern iron, making it more brittle, less strong.

The Saugus works failed finally due to a variety of reasons. But as America's first quantity iron producer and a training ground for skilled workers, it was a huge success.

Cast iron was one product . . .

Wrought iron was another

everybody's favorite supermarket

made of flat-rolled steel

Appliances as well as kitchen equipment like cabinets and sinks need a good *suit of armor*—made of flat-rolled steel—when they're put to the test of normal use.

If you use flat-rolled steel in your products, rely on a specialist—Great Lakes Steel. Our entire organization is devoted to the business of making more and better flat-rolled steel for every application. Many manufacturers have found we have some unique qualifications to help them improve products and reduce costs. We would like the opportunity to work with you on your problems.

Call on our 25 years of specialization in flat-rolled products. Our representative will be glad to discuss your particular needs at your request.

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Ecorse, Detroit 29, Michigan

PRODUCER OF N-A-X HIGH-TENSILE STEEL

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By FLOYD G. LAWRENCE *Detroit Editor*

Fact, Fiction About Hot-Rodders: How They Help Auto's Evolution

EVER ROLL your car up to 60 miles an hour in first gear with tires peeling rubber all the way, snap-shift into second and feel the rear end squiggle as it tries to get ahead of its burden? If the answer is "yes," you're either an optimistic liar or a hot-rodder.

One pet peeve of this column is the penchant of accident reporters to use the term "hot-rodder" every time a jalopy with a split muffler scrapes a fender. Hot-rodding is the antithesis of jalopy-jockeying.

Semantics—Although the exact origin of "hot-rod" is uncertain, the National Hot Rod Association believes it is a contraction of the awkward "hot-roadster," dating back to the twenties. Certainly it's a much more convenient handle than the English "hotted-up machine," which is its parallel abroad. But no matter what you call it, or why, a hot-rod is a car modified for greater performance.

In the strict sense of the term, if you tossed out your rear seat to reduce weight and added a Hollywood muffler to decrease back pressure, you would be a hot-rodder. The performance of your car would improve somewhat. But such modification lacks the degree of home-engineering and ingenuity of the true hot-rodder.

Translation—The true hot-rodder will take a Ford, Merc, Caddie or similar mill, convert it into a stroker with a full house, dual jugs, chopped flywheel, high-lift cam and straight-through talking pipes. Translated, this means that special heads are added to increase the compression ratio and dissipate the greater heat, the crankshaft has been turned down for longer piston stroke, the camshaft has been reground, dual carburetors have been installed and the flywheel has been lightened to decrease inertia. The straight-through talking pipes, of course, are just dual exhausts.

When you get into modifications of that sort, horsepowers are well up over 50 per cent increased, stresses in the engine are proportionately greater and the car diminishes similarly in normal utility. With an idle that sounds like a stuck pig with the hiccoughs, a real hot-rod is a much less reliable traffic machine than the Detroit iron the builder started with. In a nutshell, that's why the Detroit engineer didn't build the car that way in the first place.

Technical Question—Has hot-rodding contributed something to the engineering of automobiles? You'll read articles in enthusiast publications that proclaim the hot-rod made the average motorist performance-conscious and fostered the horsepower race. Others will point out that camshaft designs developed by hot-rodders have been adopted by auto companies or that

End of the horsepower race? Sporting an Allison 1710-hp engine driving through four rear wheels, this car averaged 140 mph for the quarter mile

A roadster powered by Cadillac lays down rubber to post an average of 95.6 for the standing quarter. Here is a typical, well-executed hot rod

Hot Rod Magazine

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multiple carburetion and dual exhausts are hot-rodder ideas.

It must certainly be conceded that there are some instances of parallel growth. The trouble is that no one has been able to demonstrate a cause-and-effect relationship. One auto company spokesman whose product is popular among the hot-rodders and who has a personal sympathy with the hot-rod movement says he would like nothing better than to cite a contribution of the hot-rodders to the industry.

Partial Answer—But auto companies have been doing most of these things experimentally or even in production for a long time. Multiple carburetion and dual exhausts were used on production cars in the twenties and before. At a recent drag race held near the Motor City, plenty of auto engineers showed up, yet in most cases they were driving their own private bombs for the fun of competing rather than to get free ideas.

It's a sad condition when auto engineers are scarcely interested in the engine of a 250-mph hot-rod. They already know what can be done with the engine, and the particular modifications the hot-rodder selects from among the variety at hand are about as exciting as discovering two hearts in a deck of cards. The one thing of solace in the situation, however, is that the engineers that do the discovering are hot-rodders themselves.

Scientific Approach — In nice, clean engineering offices the camshaft designer will be asked to create a cam to give top horsepower with a given type of fuel under given conditions. The variables are fed into an electronic brain and the answer is derived from the formula in a matter of minutes. This information can then be transferred to a punched card and the card used to grind the camshaft in accordance with the results. The camshaft is then put into an experimental engine and data taken that may or may not be useful in future engine design.

That's where the hot-rodding comes in—to prove the results of the already well-known formulas. Further, it may be observed when the engine is in operation that a valve surge is interfering with maximum output. The hot-rodder auto engineer will then ask for valve springs to take care of the surge, once again computed by formula.

Digression — Incidentally, if you're interested in engines you've probably heard that hydraulic tappets create valve surge at figures like 4500 rpm or so. Don't believe it. Hydraulic tappets merely take up the bounce created by inadequate springs. Frank Burrell, well-known Cadillac engine wizard, has turned over 6000 rpm with a hydraulic tappet Cadillac engine and modified valve springs.

But to return, the basic function of hot-rodding in an auto company is to gather data on the limits of engine modification. What will the Chrysler engine do to its main bearings when it is run at 353 hp on regular fuel? How do the Packard valve seats react when subjected to the heat and pounding of such operation? Will the Lincoln valve train take the torture of hopped-up full-throttle running?

Practical Hot-Rodding — These are the questions the engineers try to answer to determine the limits. For once the limits are found, the production can then be kept safely within those limits, giving added reliability to the car you drive every day. Hot-rodding in the auto companies is a form of engine torture for development, for as the limits are found, new means to exceed those limits are developed by metallurgy and manufacturing.

The result of a 275-hp Cadillac engine running at full throttle for a thousand hours may be a new metal for main bearings that will permit your chariot to run at 150 hp or less for a couple of hundred thousand miles, piston rings that will seal better and last longer or valves that will never have to be replaced. The formulas give the answers, but the answers must be proved and coincident data collected. And that is auto company hot-rodding.

Results—As those limits go up, the passenger car engine is never produced close to those limits, unless the design is verging on obsolescence. One reason for the changes in engines this year is the proximity of limits in current production models. But there's plenty of gap. The Chevrolet, for example, will introduce a new V-8 to replace the in-line six that has lasted so well. Although the passenger cars pull about 125 hp with the current engine, the Corvette version is pegged at 150 hp without strain and rodders get 220 hp from the mill and live to tell about it.

That gives an idea of how far beneath the limits your engine is held in the interests of reliability, and it is this cushion with which the hot-rodder plays. When you realize how broad the limits are, the achievements of the hot-rodders are not quite so miraculous, and there's a temptation to do a little head-milling on your own.

Contribution — But don't discount the hot-rodders. Certainly they have contributed to the revival of motoring as a sport, a pitifully lacking spirit in this country for many years. They have helped rekindle the interest of the average man in cars and of young people in the mechanical aspects of the automobile. They have stood as an impartial judge of engines, which may have well contributed to incentive for development.

Auto, Truck Output

U. S. and Canada

	1954	1953
January	594,789	614,000
February	573,801	628,017
March	672,485	752,149
April	676,233	782,491
May	621,249	684,843
June	623,732	713,778
July	543,540	756,592
August	523,073†	640,186
September		605,228
October		651,153
November		457,852
December		529,588
Total		7,815,877

Week Ended	1954	1953
Aug. 7	124,168	137,671
Aug. 14	119,208	156,526
Aug. 21	121,736	163,635
Aug. 28	113,496	152,866
Sept. 4	110,706	132,574
Sept. 11	105,000*	122,863

Source: Ward's Automotive Reports.
†Preliminary. *Estimated by STEEL.

DIE CAST OF ZINC

for WEBCOR

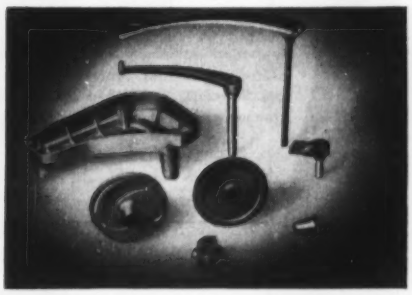
Here's Why....

The engineers of Webster-Chicago have one aim in their industrial lives—to provide high fidelity sound reproduction at a price which will assure wide market appeal for every instrument in the Webcor line. To achieve this objective in their three-speed HF phonographs, the eight odd-shaped ZINC Die Cast components shown below are employed in several models. Of these, the above tone arm-rest housing best illustrates the physical and economic advantages gained.

Metal Saving—Since the cost of any product is influenced by the amount of material consumed, it should be noted that the above housing (as shown from the underside) has been ingeniously cored—*in the casting operation*—to eliminate all unnecessary metal, and no metal need be removed and wasted in secondary operations. This metal saving is accomplished with no sacrifice of strength since cross ribs are judiciously located at points of stress.

Labor Saving—The housing and the other ZINC Die Castings have made possible a compact phonograph mechanism with an absolute minimum number of parts. When such complexity of shape can be achieved, one part can be made to serve in place of several. This, together with the accurately located cast bosses, makes for trouble-free assembly at the lowest possible cost. A further labor saving results from the smooth as-cast surfaces of the parts which easily receive and hold handsome, durable coatings.

For further examples of successful product engineering with ZINC Die Castings ask us—or any die casting company—for a copy of "The End Uses of Zinc Die Castings."



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The New Jersey Zinc Company
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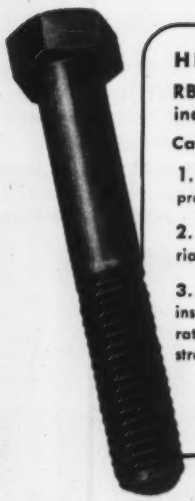
The Research was done, the Alloys were developed, and most Die Castings are based on
HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC

Sure, you'd need special cap screws here!

Some people have strange ideas on tightening cap screws.

Like the manufacturer we ran across recently. His workmen tightened cap screws far beyond their load limit as a matter of course. Naturally, this caused costly screw failures in the field. Also naturally, the boss figured the only way out was to buy expensive special screws with higher physical properties. Just in time, a sharp-eyed RB&W "fastener engineer" pointed out that a high-quality standard RB&W cap screw could do the same job — if the tightening method was corrected.

This incident spells out a cost-saving story for every user of fasteners. Maybe there's a stage in your operation where you're using a fastener designed for a bigger job than you're giving it. So it's important for you to know that an RB&W *standard* screw, nut or bolt can often give you the same dependable service you're paying extra for now. The facts in the box at right make it well worth a phone call to the nearest RB&W office to find out how these very special standards can do a job for you. RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY, Port Chester, N.Y. 4.4



HERE'S WHY...

RB&W standards often surpass industry standards.

Cap screws, for example:

1. They're cold-headed — the process that produces the best bolts and cap screws.

2. Cold-heading requires superior materials — resulting in sounder products.

3. Modern equipment and quality control insures precise sizes, superior finish, accurate threading — for fast assembly and stronger end products.

4. RB&W cold-heads the widest size range in industry.

RB&W **RUSSELL, BURDSALL & WARD**

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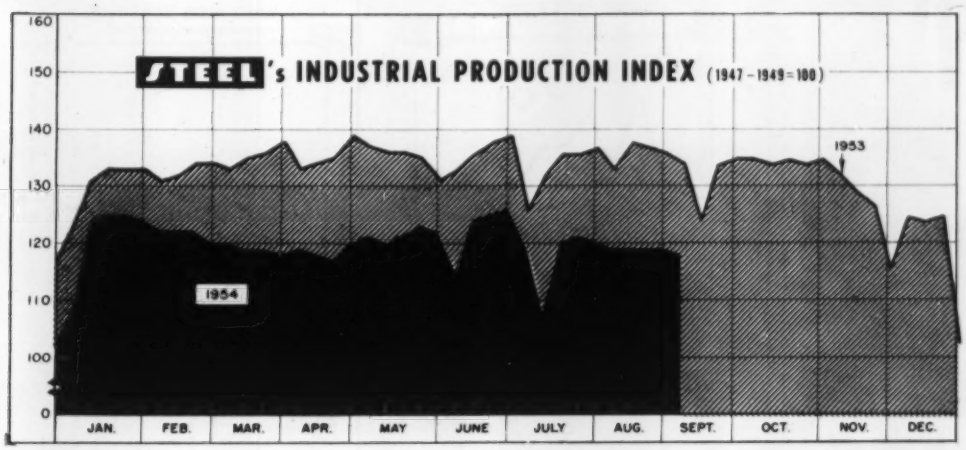

LATEST WEEK*	118
PREVIOUS WEEK	119
MONTH AGO	119
YEAR AGO	134

* Week ended Sept. 4.

Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 11%.

Steel and Autos: Key to the Fall Business Upturn

OCTOBER'S the month to watch. That's when STEEL's industrial production index will start climbing.

The index held steady through August at a so-so 119. The Labor Day holiday made a dent, but all signs are that it will bounce back to about 120 for the rest of September.

A Brake — Changeover in the auto industry will be the factor holding the index down. Electricity and freight car loadings will hold rather steady, while steel output should pick up.

Indications are that the expected upturn in steel has started. Significant are reports that the auto industry has started ordering in quantity. This trend should gain momentum through September, bearing out the industry's predictions of a quite respectable operating rate in fourth quarter.

The Pacesetter—Electric output will continue at close to record levels. The air conditioning season is almost over, but lengthening days and rising industrial use will take up most of the slack. Until this summer, a 9-billion-kilowatt-hour week was a rarity; it is more commonplace now and will become more so as 1954 goes to a close.

Freight car loadings are the sad sack of the index factors. They have been substantially under last year, with little if any pickup in sight for this month. Seasonal factors should be coming to the rescue soon, though.

A Slide—The way the railroads have been working this year is shown by profit figures for the first seven months, just released by the Association of American Railroads. Net income of 130 Class I roads was $272 million, compared to $490 million for the same period a year ago. The July comparison is as bad: $49 million in 1954, $72 million in 1953.

Of the 130 railroads, 32 failed to earn interest and rentals dur-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,500	1,525	2,011
Electric Power Distributed (million kwhr)	9,050[1]	9,227	8,694
Bitum. Coal Output (daily av.—1000 tons)	1,234	1,260	1,623
Petroleum Production (daily av.—1000 bbl)	6,125[1]	6,141	6,534
Construction Volume (ENR—millions)	$376.7	$224.2	$214.3
Automobile, Truck Output (Ward's—units)	110,706	113,496	132,574
TRADE			
Freight Car Loadings (unit—1000 cars)	678[1]	677	799
Business Failures (Dun & Bradstreet, no.)	188[1]	184	178
Currency in Circulation (millions)[3]	$29,923	$29,786	$30,240
Dept. Store Sales (changes from year ago)[3]	+1%	0%	−9%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$16,955	$17,373	$16,487
Federal Gross Debt (billions)	$275.0	$274.7	$273.3
Bond Volume, NYSE (millions)	$14.7	$15.0	$11.7
Stocks Sales, NYSE (thousands of shares)	9,613	10,112	6,554
Loans and Investments (billions)[4]	$83.0	$82.9	$79.3
U. S. Gov't. Obligations Held (billions)[4]	$36.1	$36.2	$32.0
PRICES			
STEEL's Finished Steel Price Index[5]	194.19	194.19	189.38
STEEL's Nonferrous Metal Price Index[6]	214.9	214.7	206.9
All Commodities[7]	109.5	110.0	110.3
Commodities Other Than Farm & Foods[7]	114.4	114.4	114.7

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1954, 2,384,549. 1953 2,254,459. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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Vari-Speed Motor Pulleys

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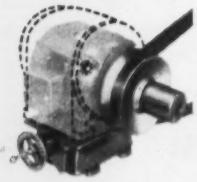
½ to 15 hp

Smaller Units! More HP!

"Spiral-groove" Lubrication



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3 One-point lubrication when unit is stopped *or in operation.*

4 Superior base construction for greater rigidity and strength, reduced vibration and noise.

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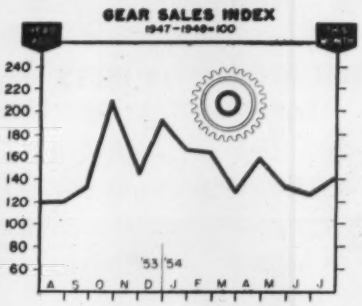
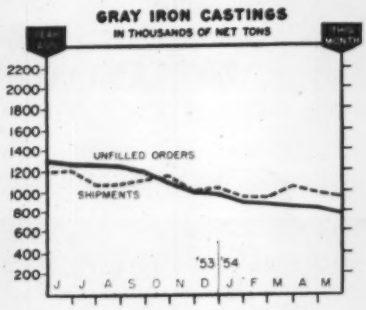
COLUMBUS, INDIANA

THE BUSINESS TREND





	1954	1953	1952
Jan.	167.4	161.4	670.6*
Feb.	165.1	188.1	539.5*
Mar.	128.6	158.9	517.1*
Apr.	158.2	217.1	478.7*
May	132.5	189.8	425.9*
June	127.4	146.5	452.3*
July	141.3	120.7	145.3
Aug.	....	121.6	132.3
Sept.	....	135.6	143.4
Oct.	....	211.1	160.8
Nov.	....	144.9	150.9
Dec.	....	194.0	140.9

*(1935-39=100)

American Gear Mfrs. Assn.

Charts Copyright 1954 STEEL.

Thousands of Net Tons

	Shipments		Unfilled Orders*	
	1954	1953	1954	1953
Jan.	932	1,162	872	1,333
Feb.	936	1,136	885	1,332
Mar.	1,047	1,264	842	1,376
Apr.	995	1,277	826	1,306
May	943	1,186	775	1,272
June	...	1,196	...	1,246
July	...	1,056	...	1,233
Aug.	...	1,069	...	1,223
Sept.	...	1,106	...	1,170
Oct.	...	1,142	...	1,076
Nov.	...	1,004	...	977
Dec.	...	1,032	...	955
Total	...	13,630		

*For sale. U. S. Bureau of the Census

ing the first seven months. During the period, total operating revenues were off 13.8 per cent; expenses fell only 8.6 per cent.

Slowdown in the Upturn? . . .

A strong indication of how business will fare through September is found in screw machine products. That industry is often useful as a short-term barometer because of generally short lead time on orders.

So far there have been few signs of improvement. There was some strengthening in July but no marked upturn has shown up yet. October and November are looked to for a change upward.

A fall-off in auto and appliance orders particularly hurt early third-quarter activity, but those industries should be boosting orders soon. A bad sign, though: There has been no marked increase in inquiries. That could mean inventories are high, but it also could mean a slower than expected upturn.

Tool and Die Shops Busy . . .

On the other hand, tool and die shops have been busy, some working close to 50 hours a week (see STEEL, Aug. 23, p. 49). Auto, aircraft, appliance and electronics industries are the most active customers.

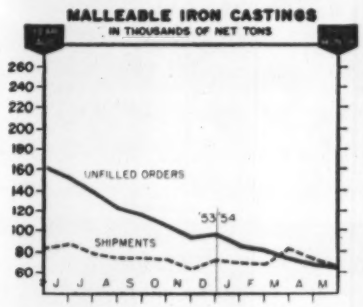
The upturn in tools and dies (lead-times are longer than screw machine products) should give encouragement to producers of the latter that business will be getting better soon.

Auto Prospects Look Better . . .

The auto industry has revised its estimates on dealers' inventories again. A few weeks ago, there was some talk that dealers were again going to be caught with large stocks. But a buying spurt that began in mid-August is bringing back optimism.

A slump in early August was what caused pessimism. But in the second ten days of the month, buying rose 5 per cent, according to *Ward's Automotive Reports.* Now if buying holds up near last year's pace, all will be rosy for a bang-up sales campaign when new models come out.

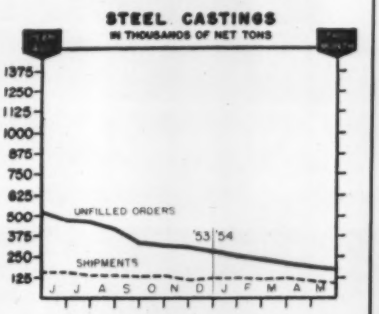
Car dealers can expect extra-heavy expenses this year, though. Besides inventory, *Ward's* lists special tools and equipment, promotion



Thousands of Net Tons

	Shipments		Unfilled Orders*	
	1954	1953	1954	1953
Jan.	70.3	87.2	85.6	174.8
Feb.	69.1	86.5	81.6	175.1
Mar.	84.3	94.5	74.2	177.8
Apr.	74.5	95.9	69.1	174.5
May	67.9	82.1	67.0	160.4
June	...	86.5	...	151.0
July	...	77.1	...	137.3
Aug.	...	73.9	...	120.8
Sept.	...	74.3	...	114.5
Oct.	...	73.5	...	104.0
Nov.	...	63.4	...	93.2
Dec.	...	72.1	...	95.6
Total	...	966.9		

*For sale. U. S. Bureau of the Census.



Thousands of Net Tons

	Shipments		Unfilled Orders*	
	1954	1953	1954	1953
Jan.	122.8	167.2	251.8	706.5
Feb.	116.5	175.7	234.6	644.3
Mar.	122.3	182.2	214.3	634.6
Apr.	105.8	179.6	197.9	573.6
May	94.6	165.6	182.5	525.0
June	....	164.7	....	475.8
July	....	139.6	....	467.9
Aug.	....	141.3	....	418.9
Sept.	....	135.3	....	327.2
Oct.	....	140.7	....	313.7
Nov.	....	114.1	....	308.5
Dec.	....	123.3	....	278.4
Total	....	1,829.3		

*For sale. U. S. Bureau of the Census.

and show room improvements as cutting into the dealers' profits. Tools to service properly an entirely new motor, such as many makes will have this year, may cost as high as $400.

Chrysler dealers are going to have to fork over about $15 per car to support a $4-million TV show. But greater sales volume is expected to make the cost more than worthwhile.

Trucks: Improvement Ahead?...

Truck sales, like autos, are down. And September's production schedule is at an eight-year low, the sixth straight monthly decline. Changeover is one of the reasons for the low schedule, but sales are down 9000 units a month compared with those in 1953, and military requirements have slipped.

An indication of better things to come for truck builders is the good volume of freight transported by truck in spite of railroad courting of shippers. Intercity tonnage transported by motor carriers in second quarter, 1954, was down only 4.2 per cent from the record second quarter of 1953, says American Trucking Associations Inc.

This is the second time in ten years that volume in the second quarter has failed to exceed that of the previous year's corresponding months. And at that, tonnage was 6.7 per cent over the 1952 period.

Construction Bounces Upward

Still churning merrily along is the construction industry. Contract awards popped up to $377 million for the week ended Sept. 2, according to *Engineering News-Record.*

Public and private construction rose sharply, and state and municipal building had their third-best week of the year. Federal work, too, went up for its best week since mid-July. Mass housing and commercial building accounted for the increase in private construction; industrial building was low but steady.

Highways and bridges also came up. This is a pretty good time to build highways, says the American Petroleum Institute. Average costs have gone down about 10 per cent in the last year. Add to this plentiful supplies of materials, manpower and equipment, and you have the reasons why the road ahead looks good for this part of construction.

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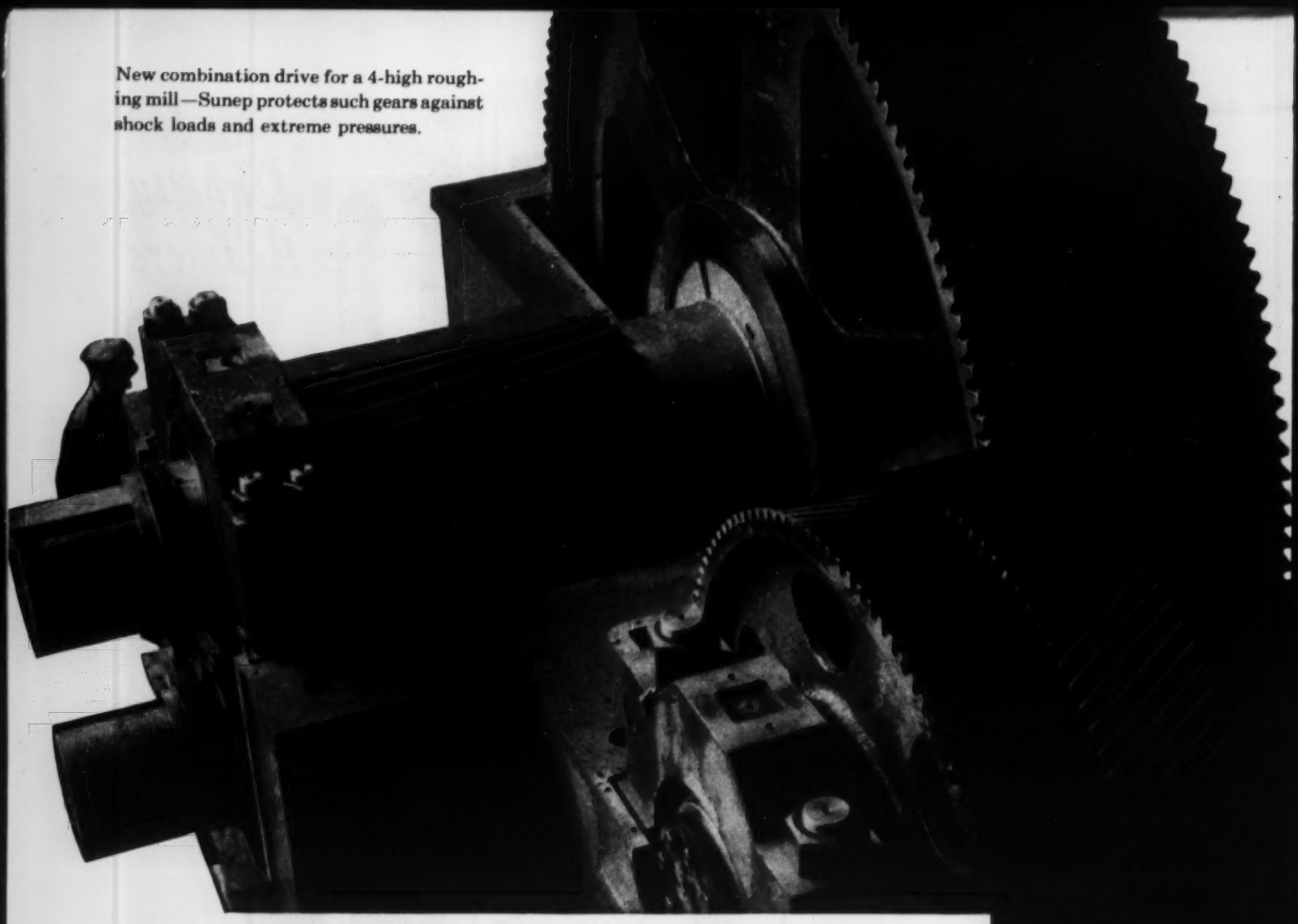

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S. J. STOWELL
. . . Tranter Mfg. sales manager

S. J. Stowell was made sales manage for **Tranter Mfg. Inc.**, Lansing, Mich. He succeeds **J. R. Tepfer**, vice president who resigned July 31 as general sales manager of the firm.

D. L. Rossiter is sales manager of a newly created division, the engineering products division, of **Inland Steel Products Co.**, Milwaukee. He formerly served as sales manager of the firm's metal lath products division, which is absorbed by the new division.

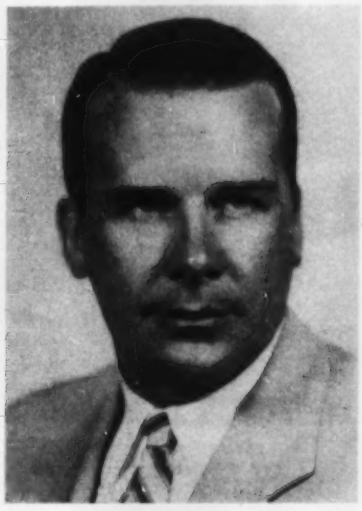
Marvin L. Steinbuch replaces **John W. Bolton**, retired, as chief metallurgist and research director of **Lunkenheimer Co.**, Cincinnati, O.

Paul R. Simon was made general manager of a newly formed scrap iron division of **Gary Steel Supply Co.**, Chicago.

Waukesha Foundry Co., Waukesha, Wis., promoted **Emil M. Howe** to vice president in charge of sales for the pump division and **John W. Weaver** to vice president in charge of sales for the foundry division.

Jack Selway becomes blast furnace superintendent of **Chester Blast Furnace Inc.**, a subsidiary of Barium Steel Corp., New York.

Col. Lee G. Schlegel, USAF (ret.), joined **H. N. Bailey & Associates**, Los Angeles, to head up its industrial tool division.



WILLIAM A. HUGHES
. . . Standard Boiler & Plate v. p.

William A. Hughes was named vice president of sales for **Standard Boiler & Plate Iron Co.**, Pittsburgh. He was sales manager.

Walter L. Brough Jr. was appointed chief engineer of Republic Steel Corp.'s **Union Drawn Steel Division**, Massillon, O. He succeeds **Alex Carnie**, transferred to Republic's Truscon Division in Youngstown. Since 1937 Mr. Brough served Timken Roller Bearing Co. in engineering and production capacities.

Thomas W. Regan is now sales manager, **General Box Co.**, Des Plaines, Ill. A company vice president since 1949, Mr. Regan was manager of operations at Winchendon, Mass., and is succeeded in the latter position by **C. E. Keene.**

Pittsburgh Steel Co. appointed **G. Gordon Lloyd** combustion engineer at its Allenport, Pa., Works.

Jones & Laughlin Steel Corp., Pittsburgh, elected **A. A. Archibald** vice president of engineering and plant and **F. T. Barton** vice president-special products and services.

Charles J. Daley joined the sales department of **Roll Formed Products Co.**, Youngstown, to specialize in development of new applications of roll-formed shapes. He has been at Youngstown Sheet & Tube Co.

JAMES F. CLARK
. . . president of ACF Industries

James F. Clark, vice president-finance, **ACF Industries Inc.**, New York, succeeds **Charles J. Hardy Jr.** as president. Mr. Hardy was elected chairman of the board to succeed **John E. Rovensky** who announced his retirement a few months ago.

Richard T. Orth joined **Westinghouse Electric Corp.**, Pittsburgh, as vice president in charge of the electronic tube division to succeed **E. W. Ritter** who continues as a consultant. Mr. Orth was vice president, Radio Corp. of America, and general manager of that company's tube division.

W. H. Blackburn fills the newly created position of assistant to the president in addition to present responsibilities as production manager and purchasing agent at **Billings & Spencer Co.**, Hartford, Conn.

Hugh Gibbons was made supervisor of the Rx Met Division, **Michigan Steel Casting Co.**, Detroit. He was plant superintendent at Cannon Muskegon Corp.

J. Robert Pauline was made vice president, **Kellogg Division**, American Brake Shoe Co. He continues to be located at the Kellogg plant in Rochester, N. Y., where he was previously division works manager.

James J. Dugan was made Detroit

N. E. WENZEL
. . . Globe Steel Tubes v. p.-operations

EDWARD H. D. GIBBS
. . . Heyl & Patterson sales manager

CONDE HAMLIN
. . . De Walt v. p.-sales

district manager, **Federal Pacific Electric Co.**

Globe Steel Tubes Co., Milwaukee, elected **N. E. Wenzel** vice president in charge of operations. He fills the vacancy left by **G. W. Walzer** who remains a director and will serve as a consultant.

Continental Steel Corp., Kokomo, Ind., promoted **Byron L. Smith** to manager of a newly established market development department. He was district sales manager in Kansas City, Mo.

Richard J. Zobel is Philadelphia district manager for **Sterling Electric Motors Inc.**

W. F. McGarrity was appointed superintendent of steel production at **Great Lakes Steel Corp.**, National Steel Corp. subsidiary at Ecorse, Mich. He recently transferred to Great Lakes from Weirton Steel Co., also a subsidiary.

At **Republic Steel Corp.'s** Cleveland steel plant **Charles W. Cravens** was made second assistant district manager and is replaced as superintendent of the open-hearth department by **Kurt Schultz.**

Edward B. Bickly was named sales manager, liquified gas division, **American Pipe & Steel Corp.**, Los Angeles.

George Beach was promoted to assistant sales manager of **Cleco Pneumatic Tool Co.'s** south-central sales division at Houston.

Edward H. D. Gibbs was made sales manager of **Heyl & Patterson Inc.**, Pittsburgh. He joined the firm in 1948 as a contracting engineer, a position he now vacates.

Le Roi Co., Milwaukee, subsidiary of Westinghouse Air Brake Co., appointed **Ray H. Rodolf** general manager, compressor division, and **Herschel V. Hiatt** general manager, engine division. Mr. Rodolf moves up from the post of sales manager, construction and mining division. Mr. Hiatt joined Le Roi about a year ago as director of engineering and previously worked with the Allison Division, General Motors Corp.

Conde Hamlin, former general sales manager, was elected vice president in charge of sales and a director of **De Walt Inc.**, Lancaster, Pa., subsidiary of American Machine & Foundry Co.

J. A. Zurn Mfg. Co., American Flexible Coupling Co., and its affiliates, appointed **Frank W. Zurn** manager of engineering sales. **David H. Lund** was made administrative assistant.

M. H. Cutler was promoted to chief structural engineer, **Stone & Webster Engineering Corp.**, Boston, to succeed **Ernest A. Dockstader** who becomes consulting

RAY H. RODOLF

HERSCHEL V. HIATT

. . . general managers for Le Roi divisions

Drills, Reams, Chamfers, and Mills Connecting Rods

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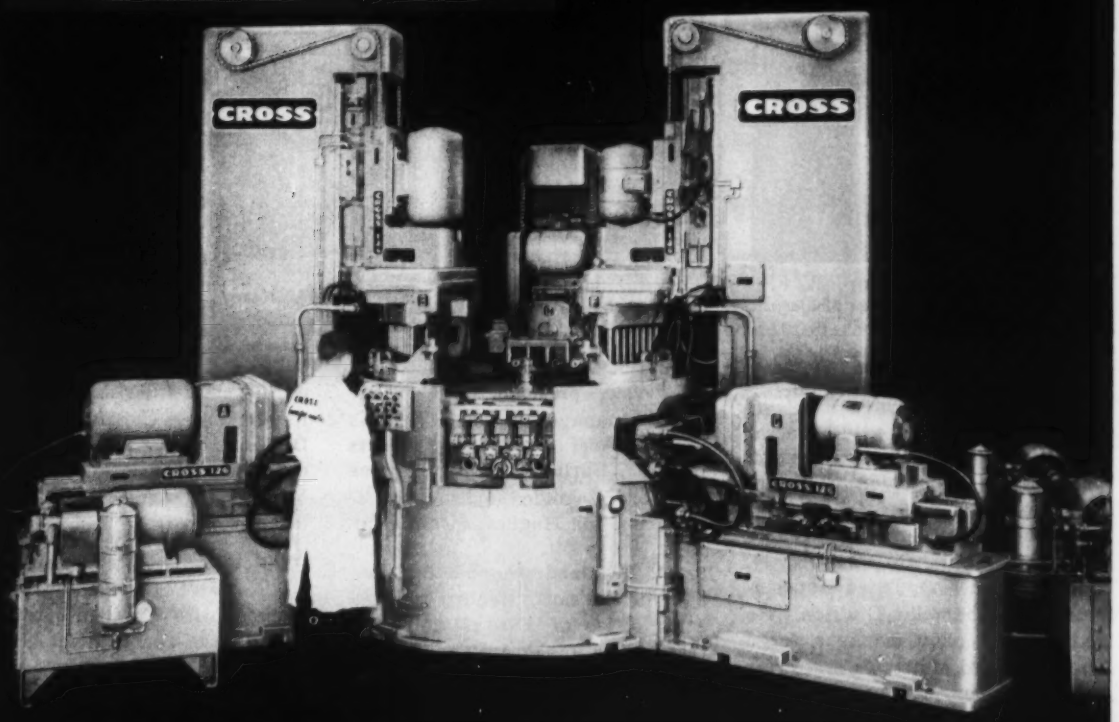

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- ★ Drills, reams and chamfers bolt holes; drills, reams and chamfers piston pin hole; and mills lock slot.
- ★ Fluid motor driven index table.
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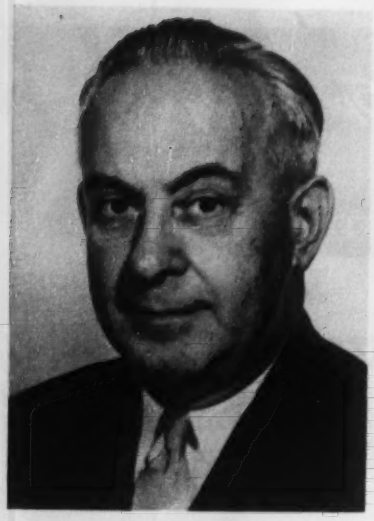
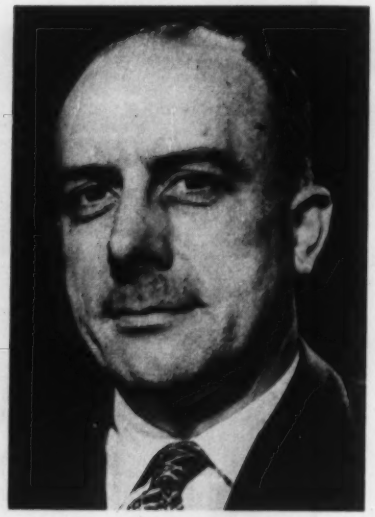


WALTER O. LEWIN
. . . gen. mgr. of Champion Division



HAROLD J. MOCK
. . . General Metals exec. v. p.

WILLIAM C. SCHNACKEL
. . . Round Chain gen. sales mgr.

engineer. **E. E. Bigelow** was made assistant engineering manager.

Walter O. Lewin was made general manager of Steel Improvement & Forge Co.'s **Champion Division,** Cleveland. He was formerly vice president and general manager of Champion Forge Co. **Deward H. Hardesty** was appointed superintendent of Champion Division. He recently was plant manager, forge plant, at Ford Motor Co.'s aircraft engine division, Chicago.

New assignments in the Permaglas Division of **A. O. Smith Corp.** at Kankakee, Ill., include **R. E. Friend** as assistant manager, **W. W. Higgins** as director of engineering and **L. T. Tegler** as chief engineer of water heaters.

Vernon R. Chesteen was promoted to southern regional sales manager of **Dayton Pump & Mfg. Co.,** Dayton, O.

Thomas R. Lawson fills the new post of sales manager for the Sunnyvale, Calif., plant of **Westinghouse Electric Corp.**

Harold J. Mock was elected executive vice president and made general manager of General Metals Corp.'s **Adel Precision Products Division,** Burbank, Calif. He was director of guided missile manufacturing for Hughes Aircraft Co.

J. M. Swetland was named manager of the north central regional sales office of **Ford Motor Co.'s** tractor and implement division. His office, located at Minneapolis, will open about Oct. 1.

William O. Riley was advanced to superintendent of the newly expanded Orange, Calif., mill of **Anaconda Wire & Cable Co.**

Radioplane Co., Van Nuys, Calif., subsidiary of Northrup Aircraft Inc., made **H. E. Riggins** vice president-contract administration, **J. R. Jacobson** chief engineer and **W. P. Patterson** assistant director of the weapon systems division.

Zeh & Hahnemann Co., Newark, N. J., appointed **E. W. Zeh** general manager.

William C. Schnackel was appointed general manager of sales of Republic Steel Corp.'s **Round Chain Division,** Cleveland. He has been connected with Republic's New York district sales office for the last seven years.

Phillips Corp., Pittsburgh, appointed **K. Bert Bowman** production manager. He leaves a position as president of United Steel & Supply Co., Tampa, Fla.

G. E. Montgomery was appointed Michigan district engineer for **Burdett Mfg. Co.** He replaces **C. E. Fitzgerald,** recently promoted to general sales manager.

American Motors Corp., Detroit, elected **Jack J. Timpy** vice president and **Donald P. Else** comptroller.

Grosvenor Swift is manager of the Toledo, O., plant of **Chevrolet Motor Division,** General Motors Corp. He replaces **W. A. Weidishofer,** retired. Mr. Swift was plant manager of the Chevrolet-St. Louis shell plant.

OBITUARIES . . .

Noble L. Hall, 53, chief industrial engineer, **Square D Co.,** Milwaukee, died Aug. 28.

Elmer J. Tompkins, 62, chief metallurgist, **Central Steel & Wire Co.,** Chicago, died Aug. 25.

Carl L. Anderson, 73, retired executive superintendent, mechanics universal joint division, **Borg-Warner Corp.,** Chicago, died Aug. 25.

Robert W. Lang, 67, retired vice president, **American Radiator & Standard Sanitary Corp.,** Cleveland, died Aug. 29.

Lewis A. Larsen, 79, former president and chairman of **Superior Coach Corp.,** Lima, O., died Aug. 25.

Myron A. Land, 48, a metallurgist for **Republic Steel Corp.,** died in Buffalo Aug. 28.

George L. Detterbeck, 80, president, **George L. Detterbeck Co.,** Chicago, died Aug. 24. He founded the company in 1911.

LESS THAN 23 CENTS PER HOUR

will put this new 3-hp, No. 2, Model CHL plain milling machine to work in your plant with

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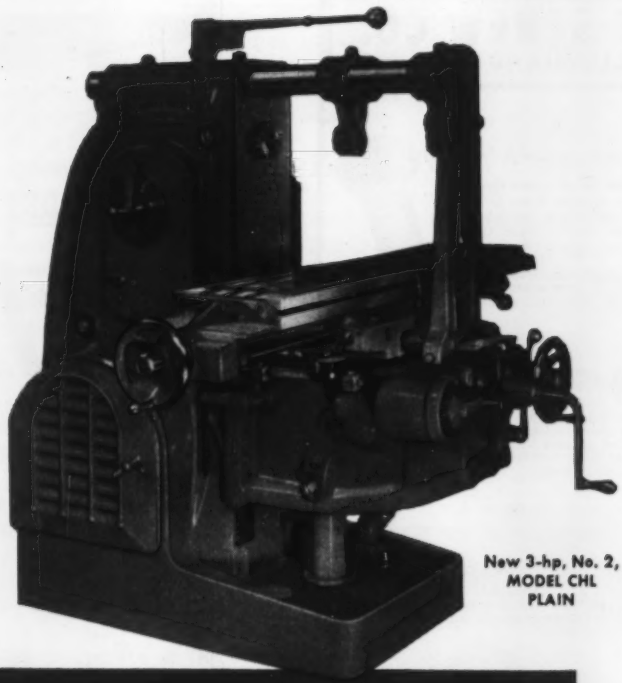

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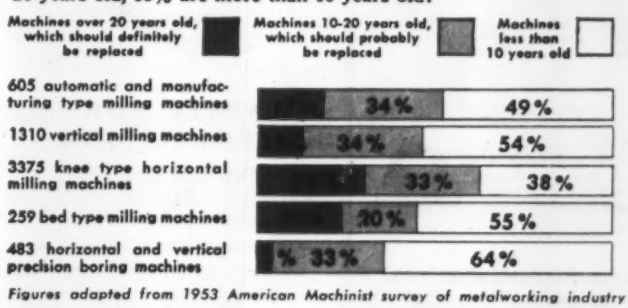
What's more, under Tool-Lease, you can rent any of over 250 standard milling machines or precision boring machines. All are available under three basic plans, with varying options to continue or terminate the lease, or to purchase the equipment. If you require special machinery or heavy-duty CSM bed types, special agreements will be considered.

For complete information on Tool-Lease, see your Kearney & Trecker representative, or mail coupon to Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wisconsin.

Here's the picture in a typical industry — GENERAL INDUSTRIAL EQUIPMENT — (see chart below). Of the 6032 standard knee type horizontal, vertical, bed and manufacturing type milling machines and precision boring machines in use today — which can be replaced by Tool-Lease equipment — 22% are more than 20 years old, 33% are 10 to 20 years old, 55% are more than 10 years old!



Figures adapted from 1953 American Machinist survey of metalworking industry

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Made of high carbon steel — AISI C-1038 — to standards for Full Finished hexagon head cap screws — bright finish. Heads machined top and bottom. Hexagon faces clean cut, smooth and true, mirror finish. Tensile strength 90,000 p.s.i. Carried in stock.

"LO-CARBS"

Made of AISI C-1018 steel — bright finish. For use where heat treatment is not required and where ordinary hexagon heads are satisfactory. Hexagon heads die made to size — not machined. Points machine turned. Tensile strength in accordance with SAE Grade 2. Carried in stock.

FILLISTER CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

"SHINYLAND" STUDS

All studs made steam-tight on tap end unless otherwise specified, with flat and chamfered machined point. Nut end, oval point. Land between threads shiny, bright, mirror finish. Carried in stock.

CONNECTING ROD BOLTS

Made of alloy steel — heat treated — threads rolled or cut — finished to extremely close thread and body tolerances — body ground where specified. Expertly made by the pioneers in producing connecting rod bolts by the cold upset process.

"HI-CARBS"

Heat Treated Black Satin Finish

Made of high carbon steel — AISI C-1038. Furnished with black satin finish due to double heat treatment. Hexagon heads die made, not machined. Points machine turned; flat and chamfered. Tensile strength in accordance with SAE Grade 5. Carried in stock.

SET SCREWS

Square head and headless — cup point. Case hardened. Expertly made by the pioneers in producing Cup Point Set Screws by the cold upset process. Cup points machine turned. Carried in stock.

FLAT HEAD CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

ADJUSTING SCREWS

Valve tappet adjusting screws — Hexagon head style — to blue print specifications — hexagon head hard; polished if specified — threads soft to close tolerance — points machine turned; flat and chamfered.

SPRING BOLTS

Case hardened to proper depth and ground to close tolerances. Thread end annealed. Supplied in various head shapes, with oil holes and grooves of different kinds, and flats accurately milled.

FERRY PATENTED ACORN NUTS

For ornamental purposes. Steel insert — steel covered. Finish: plain, zinc plated, cadmium plated. Size: 9/16", 3/4", 15/16" across the flats.

Tapped 1/4" to 3/4" inclusive. Cross section of Ferry patented acorn nut, showing how steel hexagon nut fits snugly into shell.

Pioneers and Recognized Specialists, Cold Upset Screw Products since 1907

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Alcoa Installing Presses

Two large forging presses at Vernon, Calif., are included in $4-million expansion plan

MAJOR plant expansion will bring two large forging presses to the Vernon, Calif., Works of Aluminum Co. of America, Pittsburgh. The project will involve about $4 million.

These presses, one of 8000-ton and the other of 1500-ton capacity, are among the first hydraulic forging presses on the West Coast.

The expansion program will provide buildings to house 72,000 sq ft of floor area for the presses, auxiliary equipment and dies, says William Holzhauer, Vernon Works manager. Construction activities are under way on a shop that will contain 27,000 sq ft.

Diversification — With these new facilities, Alcoa will have a fully diversified plant on the West Coast to produce aircraft forgings. The presses will be especially valuable for producing forgings of the precision type involving little or no draft angle. Aluminum forgings are vital structural members in the wings, fuselage and engines of supersonic jet fighters and bombers.

The 8000-ton press is being built by Schloemann, A. G. Dusseldorf, Germany, and is expected to be in operation by the fall of 1955. It has a three-cylinder design that is unique in this size. The three separate hydraulic cylinders allow the press to operate at three different capacities. By operating with one, two or three cylinders, it will be possible to forge with pressures of about 2700, 5400 or 8000 tons.

Installation work on the 1500-ton press will begin soon. This press, scheduled to be placed in operation early next year, will allow larger and more varied hand forgings and will enlarge the scope of impact and precision forgings.

Existing plant facilities at the Vernon Works for preparing and heating forge stock, as well as trimming, heat-treating and inspecting finished forgings, will be integrated with these new facilities.

Forging equipment at the Vernon Works already includes forging hammers ranging from 2000 to 25,000-lb capacity and several mechanical forging presses. Also located at Vernon are a large foundry for producing aluminum and magnesium castings in sand, plaster and permanent molds; an aluminum extrusion plant; and facilities for producing aluminum rivets and drawn tube.

Mueller Buys Aluminum Firm

Mueller Brass Co., Port Huron, Mich., purchased Sheet Aluminum Corp., Jackson, Mich., producer of sheet and strip aluminum. This marks another step in Mueller's expansion and diversification program. In 1951, the firm acquired Valley Metal Products Co., manufacturer of aluminum windows and extruder of special aluminum shapes.

Equipment Maker Opens Plant

American District Steam Co., North Tonawanda, N. Y., maker of steam distribution equipment, formally opened its expanded plant with 40,000 sq ft of additional space.

Buffalo Rod Mill Capacity Up

United Engineering & Foundry Co., Pittsburgh, was awarded a contract to modernize a 16-stand rod mill in the Buffalo plant of Wickwire Spencer Division of Colorado Fuel & Iron Corp., Denver. The rebuilt mill will be a 20-stand installation. It will roll three strands with a maximum delivery speed of 4400 fpm. United will supply new roll stands, complete new drive mechanism and coiling equipment.

Deluxe Opens Branch Office

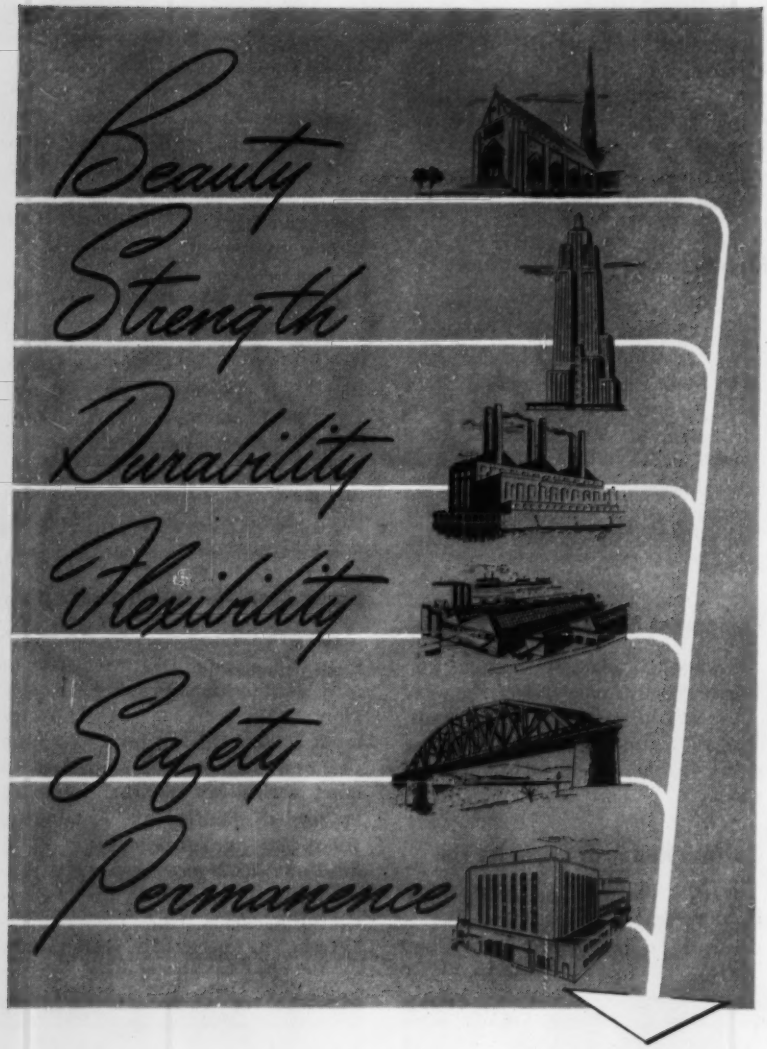
Deluxe Saw & Tool Co., High Point, N. C., a subsidiary of Rockwell Mfg. Co., Pittsburgh, opened a midwest regional sales office at 6459 N. Neva Ave., Chicago. A factory service station has been established at 5401 W. Lake St., that city. Robert L. Ford is midwest regional manager.

Plans More Titanium Capacity

Rem-Cru Titanium Inc., Midland, Pa., will expand its facilities to melt and process titanium. A new plant will increase its capacity from 2500 to 11,150 tons. Work on the new facilities is expected to start within six months. Rem-Cru is owned jointly by Remington Arms Co., a subsidiary of E. I. du Pont de Nemours & Co., Wilmington, Del., and Crucible Steel Co. of America, New York. A certificate of necessity will permit

Motch & Merryweather Celebrates 50th Anniversary

This month marks the 50th anniversary of the founding of Motch & Merryweather Machinery Co., Cleveland. The company, now in the second generation, has as officers: E. Franklin Motch (left), president and treasurer; George E. Merryweather (right), vice president and secretary; Clare R. Kubik, vice president, administration; Henry A. Murton, assistant treasurer; W. F. Edwards, assistant secretary; Milton R. Kubik, controller; W. J. Chamberlain, director of sales



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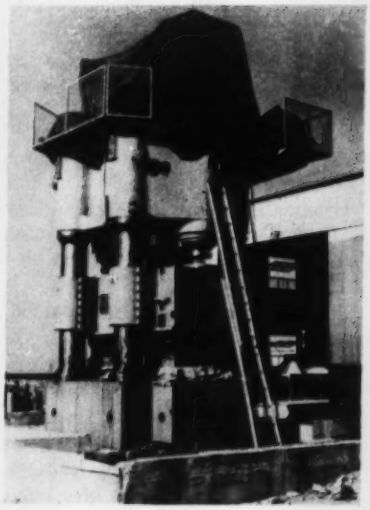


In True Texas Tradition

Temco Aircraft Corp., Dallas, built an entire building around this giant 5000-ton press. Because of its size, it was erected outdoors. The press was designed and built by Hydraulic Press Mfg. Co., Mt. Gilead, O.

Rem-Cru to take accelerated amortization on 75 per cent of the plant's $12,775,000 cost.

Arrow Steel Changes Name

Arrow Steel Co., Phoenix, Ariz., changed its name to Garland Steel Co. The firm makes and erects steel products and is installing equipment for the manufacture of corrugated culvert pipe.

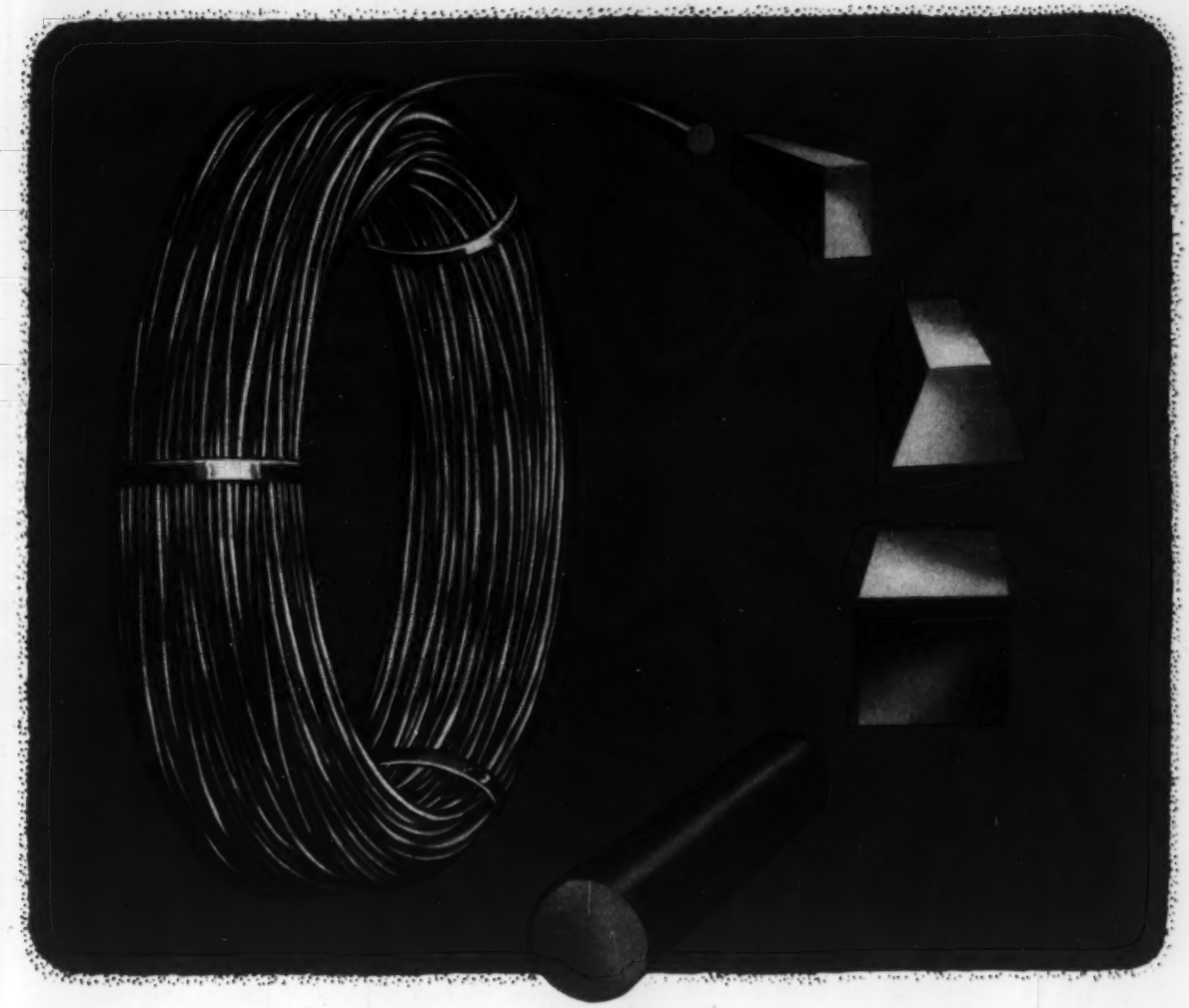
West Coast Firm Expands

Stainless Steel Products Inc., Burbank, Calif., expanded its plant for increased production of jet engine and aircraft assemblies.

Birdsboro Steel Sale Approved

Shareholders of Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., approved the sale of substantially all assets of the company to Frederick W. Richmond of New York for $3,970,000. Mr. Richmond, chairman of three machine tool and gear-grinding companies, heads a New York financial group that recently offered to purchase Follansbee Steel Corp.'s assets for about $9 million. The buyer is expected to continue the business of the company in its

For Your Steel Requirements!



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Our steel mill produces ball and roller bearing quality, key stock, cold heading quality spring steel whose surface tolerance, physical specifications and machineability must meet specific requirements. Let us help cut your production costs with fine quality steel. Write for further information.

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Reversing Ram Simplifies Press Operation

Model MO 6-12. Handles plate to 16'-6" x 7/16". Other Steelwelds available for working plate to 24 feet and thicknesses to one inch.

With a reversing ram drive you can back the ram or upper die away from the work at any point in the stroke. It is not necessary for the ram to continue through in one direction as when only the normal press drive is provided.

This feature speeds locating the correct ram position to achieve a specified bend or shape. It saves time and spoilage when trying new dies.

Reversing ram machines have two complete drives, including motor, flywheel, clutch and brake. They are controlled by individual foot pedals on two different shafts, located one above the other across the front of the press.

The reversing ram feature is optional and may be provided on any Steelweld Bending Press. It adds greatly to the ease of operation and because of time-savings it enables, rapidly absorbs the extra original cost.

Steelweld Bending Presses are such versatile tools with so many outstanding features that we urge you to learn all about them. As a starter, send for the catalog below.

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current locations with present management and personnel. Birdsboro makes steel castings, metal specialty items and industrial equipment.

Warehouse Opened in Buffalo

Gibraltar Steel Corp., recently incorporated as a wholly owned subsidiary of Lion Steel Co., Detroit, opened a warehouse in Buffalo. The firm, specializing in flat-rolled steel products, has leased space in a building at 35 Roetzer St., that city. Bert Perell is president of Gibraltar Steel; J. W. Lyons, vice president and general manager.

Equipmentmaker Enlarges Plant

Stewart-Warner Corp.'s U. S. Machine Division, Lebanon, Ind., is erecting a 50,000-sq-ft addition at the largest of its three plants in that city. They make heating and cooling equipment.

Youngstown Firm Buys E.A.S.

Youngstown Foundry & Machine Co. acquired E.A.S. Inc., both of Youngstown. Assets of the engineering firm include designs for a full line of aluminum extrusion presses. Youngstown Foundry has been producing some of these presses for E.A.S. under contract for other firms. Now it will manufacture them under its own orders, along with its regular line of steel mill equipment.

Medart Sells Division

Medart Co., St. Louis, sold its Heavy Machinery Division to Emerman Machinery Corp., Chicago. Emerman has contracted to sell the machinery to Continental Foundry & Machine Co., Chicago and Pittsburgh.

Metalworking Firm Expands

R. C. Mahon Co., Detroit, completed an expansion program, adding 130,000 sq ft of factory space and 20,000 sq ft of office space. The company's products include insulated steel walls; deck roofs; structural steel; spray booths; ovens; rust-proofing machines;

(*Please turn to page* 108)

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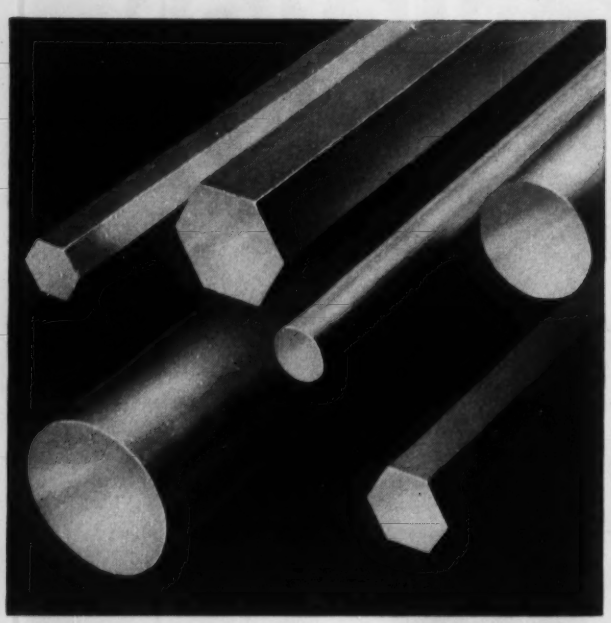
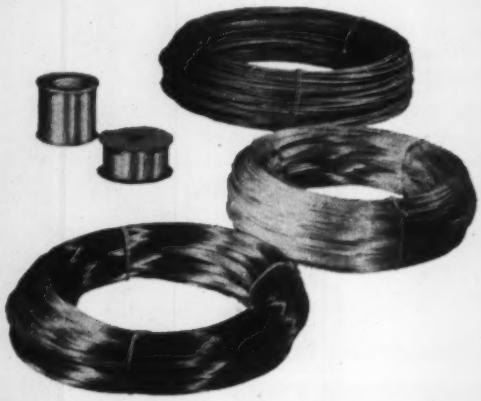


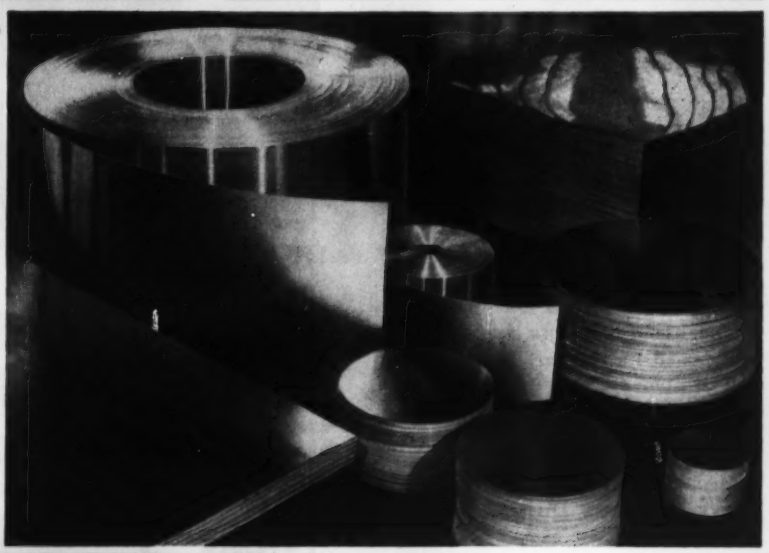


Wire

Supplied as round drawn wire, hexagonal wire, rivet wire, welding wire, screen wire, EC wire, redraw wire.

Rod and Bar

Available in a wide range of alloys in rolled and cold finished rod and bar, round and hexagonal standard screw machine stock, hexagonal bar, redraw rod, rivet rod and round forging stock, square and rectangular bar.



Sheet and Plate

Supplied as flat sheet, plate, coil sheet, circles in a complete range of alloys, sizes and tempers. Specialty sheets available on inquiry.

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Kaiser Aluminum produces Pig, Ingot and Extrusion Billets in a range of alloys and sizes to meet your specific requirements.

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Extruded Shapes to meet your specifications

All standard alloys are available in custom shapes (solid, semi-hollow and hollow), structural, rod and bar, and in extruded tube. Like all our products, extrusions are manufactured under metallurgical control—thus assuring you of highest quality.

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We believe we are ideally equipped to work with you, because serving manufacturers with basic aluminum is our primary business.

In recent years, our services have been expanded in order to keep pace with our greatly increased production capacity—which today stands at close to 30 per cent of all the primary aluminum made in this country.

We have vastly expanded our national warehousing system, our distributing program, and our staff of metallurgists and field engineers.

We believe that the kind of service we offer—combined with the unsurpassed quality of Kaiser Aluminum—should be of particular interest to all aluminum fabricators in these days of stiffer competition.

For complete information, call or write any Kaiser Aluminum sales office, located in principal cities. See our catalog in Sweet's Product Design File or write for copy. Kaiser Aluminum & Chemical Sales, Inc., *General Sales Office*, Palmolive Bldg., Chicago, 11, Illinois. *Executive Office*, Kaiser Bldg., Oakland 12, California.

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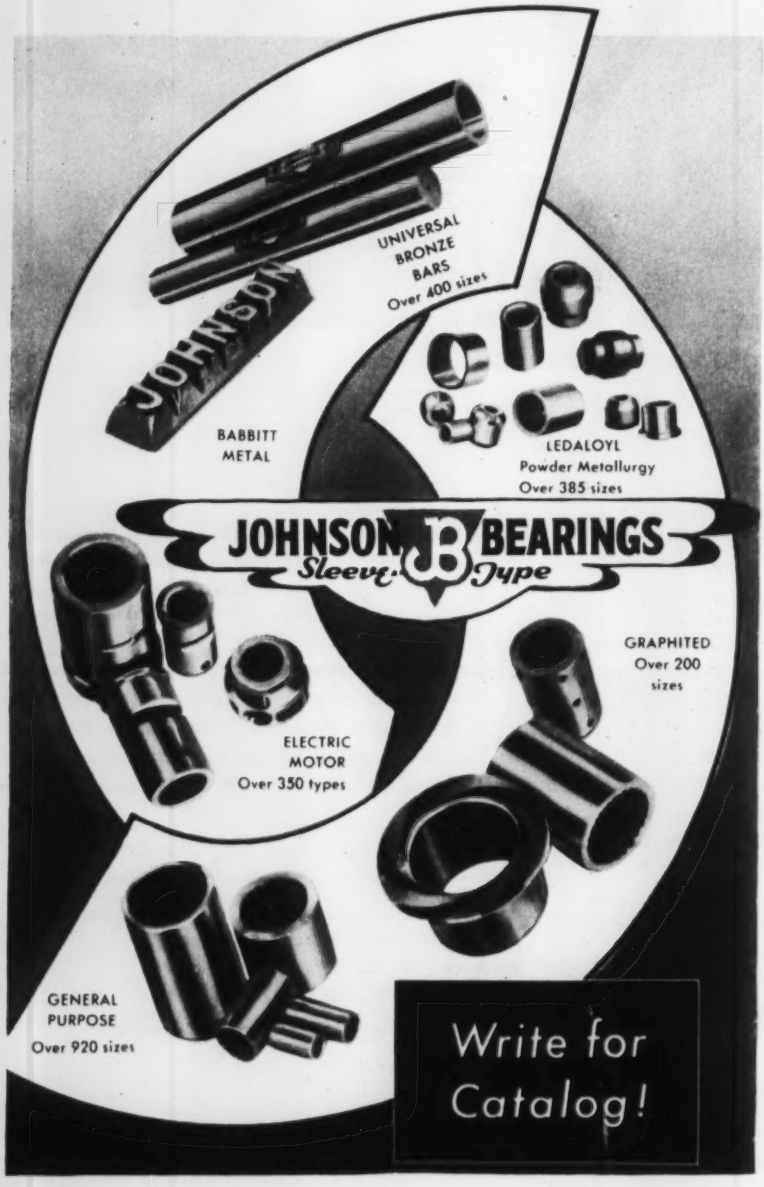

(*Concluded from Page* 105)

metal cleaning machines; dust collectors; filtered air supply units; and complete enamel, lacquer, paint or varnish-finishing systems.

Plans Steel Container Plant

Sexton Can Co., Everett, Mass., will open a plant in Oshkosh, Wis., about Nov. 1 for the production of steel containers for the paint and chemical industries.

World Series Tickets?

S & S MACHINERY CO., Brooklyn, N. Y., appointed Arnold E. Corwin director of its visitor's reception bureau. The new setup is offered as a service to out-of-town visitors. By contacting Mr. Corwin, information on train and plane reservations, hotel accommodations, theaters, restaurants and similar services will be provided.

REPRESENTATIVES

Louthan Mfg. Co., East Liverpool, O., a subsidiary of Ferro Corp., Cleveland, appointed Frederic B. Stevens Inc., Detroit, as sales representative for its foundry supplies.

Murray Iron Works Co., Burlington, Iowa, maker of boilers, appointed MacIsaac & Menke Co.'s Pipework & Boiler Division, Los Angeles, as its western representative.

Electric Regulator Corp., Norwalk, Conn., appointed Gardner & Henry, Charlotte, N. C., as its sales representative in that territory.

Insul-Mastic Corp. of America, Pittsburgh, licensed Malcolm Builders Inc., Indianapolis, and National Bond Insulators, Bethlehem, Pa., to sell and apply its reinforced asphaltic coatings.

Clark Equipment Co., Buchanan, Mich., appointed Eureka Boiler

Century

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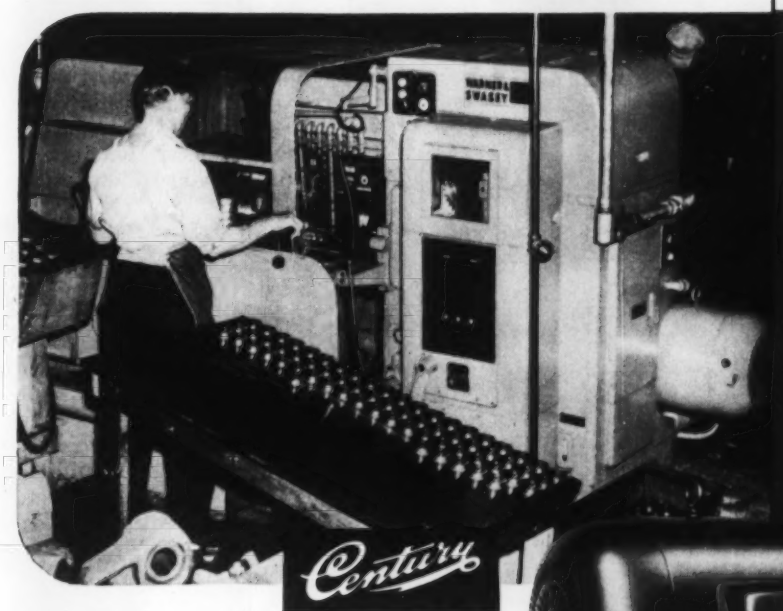

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Century Motors are widely known in the metal working industry for their mechanical precision and unusual freedom from vibration—matching the fine equipment they drive.

Century Performance Rating is available to you because of the wide range of specifications from which to select. Motors are offered in A. C. or D. C.—⅛ to 400 H.P.—constant speed or speed control in fine steps.

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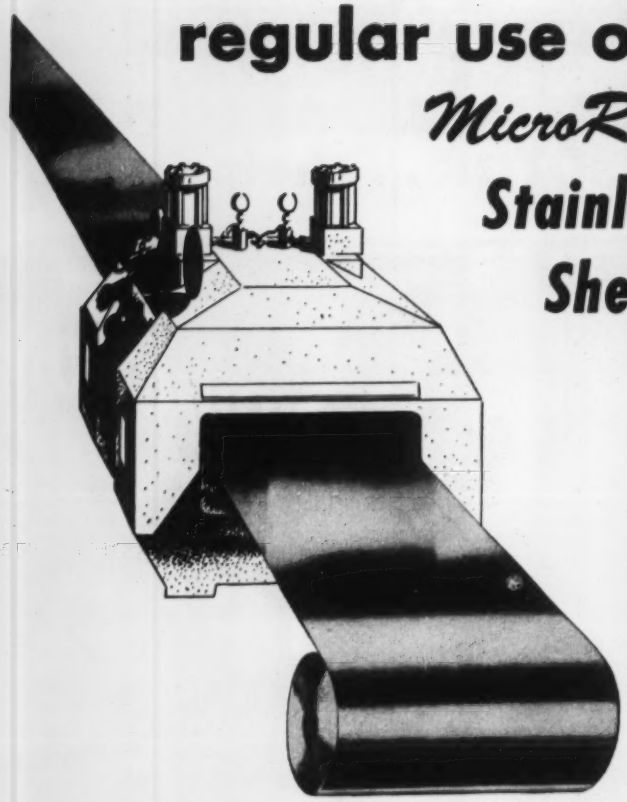

SAVES MONEY!

Stainless sheets are usually ordered by gauge number—with permissible A.I.S.I. thickness variation of plus or minus 10%—but are sold on a weight basis. Thus, you may order 18 gauge, needing about .0475″ thickness, and receive .052″ thickness. But Micro Rold may be held to a 3% plus or minus tolerance; and you may order by gauge number, specifying that it be rolled on the "light side" of the gauge range. While these savings may not be apparent in every single sheet of MicroRold, the weights will average less than the theoretical when figured over a period of time. These savings can be substantial in your annual profit picture.

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Works, Eureka, Calif., to sell and service fork-lift trucks, straddle-carriers and other materials handling equipment made by its Industrial Truck Division.

ANNIVERSARIES

Curtis Mfg. Co., St. Louis, is celebrating its 100th anniversary this year. The company's diversified line is marketed through its Pneumatic Machinery, Refrigerating Machine, Saw and Clutch Disc sales divisions.

ASSOCIATIONS

Tubular Exchanger Manufacturers Association, New York, appointed Karl A. Gardner as chairman of its technical committee, succeeding Sigmund Kopp, who is retiring. Mr. Gardner is chief engineer of Griscom-Russell Co., Massillon, O.

NEW ADDRESSES

The London city council has renamed some streets. The new address of the **Institution of Mechanical Engineers** is now No. 1 Birdcage Walk, Westminster, London S.W. 1.

Kaw Valley Steel Co. moved into new quarters at 1103 S. Mill St., Kansas City, Kans. The firm fabricates and erects miscellaneous iron and steel, structural steel and ornamental iron items. V. R. Bartley is president and general manager.

Trane Co., La Crosse, Wis., moved its branch sales office to 644 E. Stone Ave., Greenville, S. C. The firm makes air-conditioning, heating, ventilating and heat-transfer equipment.

U. S. Atomic Energy Commission's Division of Raw Materials transferred its New York office to Washington. This office, under the direction of Dr. Phillip L. Merritt, is responsible for AEC's domestic and foreign uranium exploration programs.

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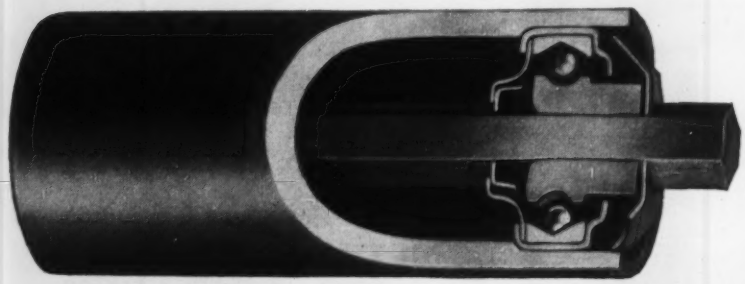

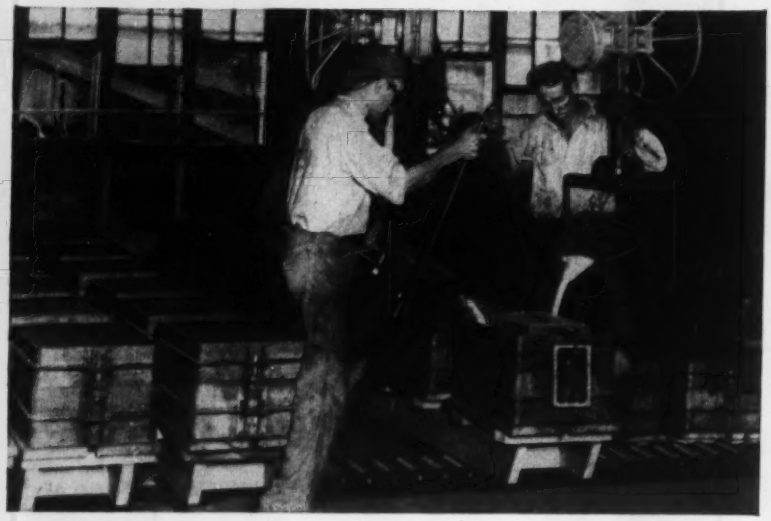

Every Standard roller conveyor is equipped with specially designed bearings that provide the maximum of protection and durability in foundry service. Spillage of hot iron is guarded against by special steel shields. These convex shaped shields fit into the ends of rollers to repel foreign matter. An exit for small particles is provided by an opening at bottom of shield.

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STEEL's 1954 Management Series . . .

The editors of STEEL herewith present the eighth in their ten-part series, Program for Management for 1954. The complete list:

1. **How You Have To Sell** (Feb. 22, p. 91)
2. **Build Better Bosses** (Mar. 22, p. 81)
3. **Automation—How Far Should You Go?** (Apr. 12, p.87)
4. **Stabilizing Production, Employment** (May 17, p. 87)
5. **Integrate Your Distribution** (June 21, p. 113)
6. **Personnel in Distribution** (July 19, p. 91)
7. **Transportation in Distribution** (Aug. 23, p. 89)
8. **Product Diversification**
9. **Foremen—Bridge to More Efficiency**
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IN THE EARLY 1900's, Borg-Warner (then Borg & Beck) was a maker of woodworking equipment that automatically shaped wagon tongues. Today, the company can boast that the 185 products made by its 27 divisions benefit almost every American every day!

A shining example of what you can do by diversifying your products to be sure, but, more important, this record of growth puts the spotlight on the part management plays in such a program.

After the first machine prospered, management at the wagon tongue factory didn't put its feet on the desk and proclaim, "We're made." They did a lot of serious thinking about survival, about growth. First thing they did was redesign the wagon tongue machine to broaden its applications. Then a long-range problem came along: "Will the wagon lose out to the auto?" Clutches were a major problem of the infant industry. The company answered the challenge by inventing and producing the first practical clutch. Later, to offer a package deal (clutch plus transmission), it tied up with Warner, a maker of transmissions. More component parts for autos followed. Then components for agricultural equipment, products for the building trades, aircraft parts, appliances, etc., etc.

Five Ways—This brand of management savvy is typical of the old hands in product diversification. Generally, they look to it as a way to put out or prevent fires in five situations:

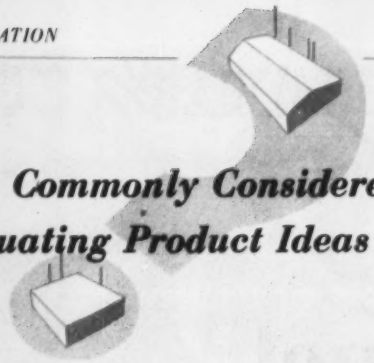
1. To replace unprofitable products. 2. To reduce cyclical or seasonal fluctuations in production and sales. 3. To utilize idle production and sales facilities by opening new markets. 4. To market a proprietary product, and 5. To arouse consumer interest and stimulate sales to hold or increase the company's share of existing markets.

Definitions — Any of the five roads to greater profit involve a new product that is either related or unrelated to your present line. You have a first cousin when you redesign a wagon tongue machine to make barrel staves (called horizontal or related diversification). Woodworking machinery and auto clutches are miles apart (called vertical or unrelated diversification).

Principles—In a game with few rules, keep this related-unrelated angle in mind.

A company is generally on safest ground when new products relate to its chief strengths. Ideally, it can be made by the present labor force with present equipment, sold by the sales force to the same classes of customers and advertised and promoted in about the same way as the present line. The risk gets greater the more the average company leaves this norm.

Especially now. Diversification threatens to take on the compulsion of a full-fledged law, with the implication that the penalty for nonobservance is a doomed enterprise. Of course, this is an overstatement, but there is a grain of caution in it: You can be oversold, if for no other reason than the subject, like the common cold, is impossible to avoid. As one publication puts it:



Factors Commonly Considered in Evaluating Product Ideas

1. What purpose will the product serve? Will it improve our quality, lower our costs, etc?
2. Would the product fit logically into our existing line of products?
3. What is the anticipated market demand? Are the potential applications for the product broad or restricted? Will the product be a large volume item or a minor item in the line?
4. Will it be possible to sell the product through our sales force and channels of distribution? If not, what will be the cost of promoting and establishing new channels?
5. Can the product be sold, in general, to the same consumers or class of trade as our existing products?
6. Can the product be manufactured and sold competitively?
7. How long would it take competition to copy or imitate the new product?
8. Is the product technically practicable?
9. How long would it take to develop the product for market?
10. Can the item be patented?
11. Could the product be manufactured by utilizing our existing plant facilities or to what extent would those facilities have to be expanded?
12. Can the product be manufactured from easily obtainable materials? Are these materials in common use by the company?
13. What sizes and types would be required?
14. Can the product be packaged in containers that are generally used in the business?
15. What effect will the introduction of the product have on engineering schedules?
16. Does the company have the manpower available or reasonably obtainable to develop, manufacture and introduce the product?
17. What would the development cost be?
18. Could these development costs be absorbed over a reasonable period of time?
19. What is the estimated return on the investment?
20. Is the item a long-profit or a short-profit item?
21. How much profit should the company be able to make and how soon?
22. What effect will the product have on our "break-even" point?
23. Are we financially able to develop and introduce the product?
24. What are the prospects for the product on a long-range basis?
25. What is the probability of successful development and introduction of the product?

Source: National Industrial Conference Board

Trend—"Today a manufacturer who isn't trying to improve his existing products and develop new ones is the exception. This creative aspect of industry is widely considered essential for continued prosperity and future growth. If evidence of this attitude were needed, it is abundantly provided by product advertising, by statements of prominent executives in the daily and technical press and by the new and improved products themselves as they come on the market." (From *New Product Development*, Volume I, of the National Industrial Conference Board Inc.)

Thirty successive issues of a daily business paper yielded more than 100 articles on the subject, ranging from the announcement that Stanley Warner Corp. is now selling baby pants as well as movies, to classified advertisements under the headings of Business Wanted, Seeking New Products. Rare is the quarterly report that doesn't say something like this: "Sales for the first quarter closely reflected general market conditions, but the company hopes plans for diversification, including a new plastic division, will make the firm less susceptible to the ups and downs of the replacement market."

Old Song, New Words

Focus — Without quarrel, diversification is a valuable management tool, but in this after-a-boom period, it is too easy to regard it as a cure-all, which it isn't. Or a fad, which it isn't.

The word probably was invented in the early 1930's, while the crash of '29 was still a bad dream. To give their sagging business a shot in the arm, some sharp investment people proposed: "Avoid what happened. Don't put all your investment eggs in one basket. Diversify them."

Now the philosophy includes products, although before we had the words product diversification, the same thing went on under other names: Common sense, foresight, imagination, smart management. Management that evidenced these qualities had companies that grew, were progressive, showed promise. In those days, adding a product was only one of the good cards in the management

deck. Today, too many companies feel it is their ace in the hole. Too often it is a joker.

Elusive — Diversification is a state of mind. About the only way you can get an idea of what companies are spending on it is to break down research expenditures.

Spending for Industrial Research 1951-1952, a Harvard business school publication, tells us, for example, that 191 companies spent $836 million on research in 1951. Of this, 42 per cent was earmarked for new product development. Records show 11 primary metal firms spent about $8 million on new products in 1951, eight fabricated metal firms about $5 million.

Over-all research expenditures went up 13 per cent between 1951 and 1952. In 1952 reporting firms assigned about 1.3 per cent of total sales to research.

Summing Up—With this kind of money going into one basket (diversification), it is well to remember it is not a panacea.

On the positive side, the fad-like atmosphere it has created is probably healthy: It puts new emphasis on good, sound management when it is needed.

One No, Five Yeses

Feet on the Ground—To get at some of the specifics involved in two basic questions—Should my company diversify? If so, in what direction? — STEEL polled several experts — research organizations, consultants, companies with diversification experience and investment and marketing people.

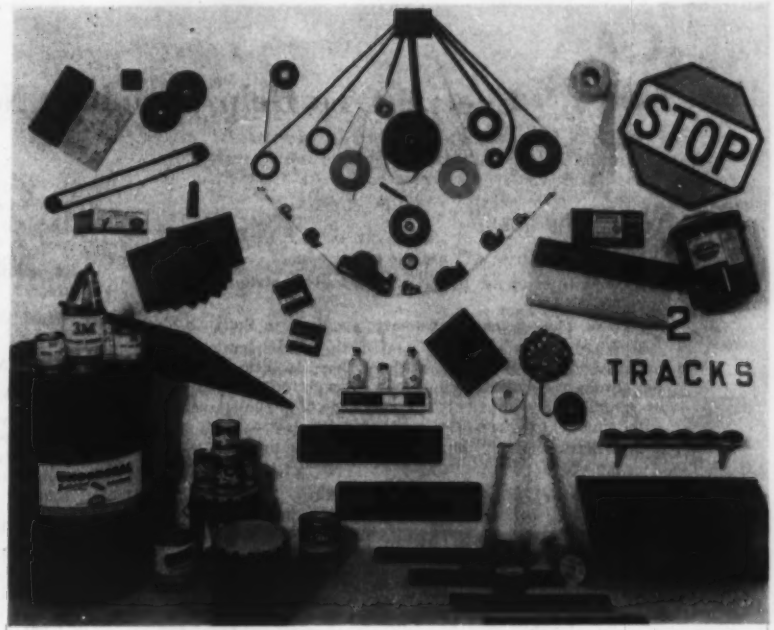
To be realistic, the experts analyzed case histories of six fictional companies. The facts in one hint strongly that the company should not diversify. Others are illustrative of the five roads to greater profit.

Case I—Answer Is No

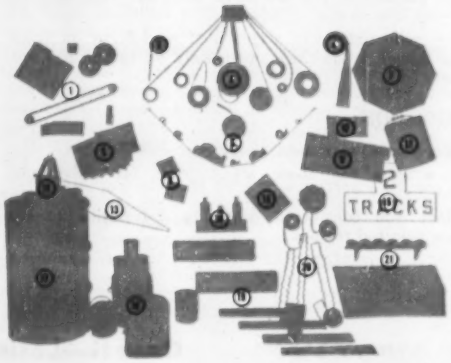
Poor Management—Company A has two lines — expensive power mowers for home use and inexpensive hand tools (such as cultivators) for gardening. The cheap line is barely treading water, and management thinks a new product, possibly lawn furniture, is the solution. The company has a reputation for quality. Even its cheap line is over-engineered and overpriced. Current facilities are considered adequate to handle lawn furniture. Finances are excellent, in spite of the failing line.

Findings: "Poor management," is the verdict. Your house should be in order before you consider diversification. When the management situation is cleared up, the company probably should drop its cheap line, then diversify. Qualifications include sound finances, a good reputation and established sales outlets.

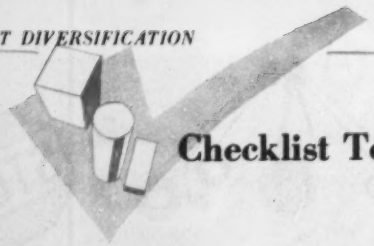
Sales and engineering should get their heads together on more realistic pricing. Probably the best



Minnesota Mining & Mfg. Co., St. Paul, Minn., has 21 related products:



1. Industrial abrasives
2. Magnetic sound recording tape
3. Magnetic sound film
4. Scotch-weld
5. Home abrasives
6. Pressure-sensitive tapes
7. Signs
8. Surgical drapes
9. Lettering film
10. Bumper kits
11. Highway striping compound
12. Automotive adhesives
13. Floor sanding paper
14. Fluorochemicals
15. Duplicating paper
16. Railroad signs
17. Auto body undercoating
18. Industrial adhesives
19. Floor covering
20. Gift wrap ribbons
21. Roof granules



Checklist To Help Introduce New Industrial Products

NUMBER OF USERS:

1. What industries will use the new product?
2. Possibilities of use by consumers, federal, state or local governments?
3. How many potential customers are there in the U. S.?
4. What factors cut down total market? Percentage of potential customers in areas where there is little use for the product? Percentage of poor prospects with smaller or larger-scale equipment? Percentage of potential users with similar products giving satisfactory service?
5. Will the size of the market change in the next two, five, ten years?
6. Are there foreign sales possibilities?

USERS' BUYING HABITS:

1. Do users generally pay cash? Buy on open-account credit? Time-payment plan?
2. Will product sell evenly all year or is it seasonal? If seasonal, when will immediate customers buy?
3. Can you level out seasonal fluctuations in sales by balancing them with different groups of purchasers?
4. Do purchasers buy ahead of need or place spot orders?
5. Are potential users accustomed to relying on trade or firm names or do they buy mainly on technical specifications?

DISTRIBUTION:

1. Where are your most likely customers?
2. How does the above affect plans for distribution channels?
3. Have you considered confining distribution to one or a few selected regions?
4. Through what channel or channels are users accustomed to buying?
5. If you were buying this product, what outlets would you prefer?
6. Which channels do you plan?
7. If your plan is unique or doesn't fit your answer to question No. 5, can you back up your decision?
8. What do you expect to do about franchises?
9. Have you considered the best way of getting your product to customers? Have you studied alternative carriers by rates, territory served, accessibility to your plant, losses in transit, packaging requirements, speed in handling and transit?
10. Exactly how will your product be prepared for shipment?

COMPETITION:

1. What firms compete?
2. What advantages do competitors have?
3. What is reputation of leading competitive firms? Their products?
4. Do you know if competitors or others will enter your field?
5. Can anybody bring out a seriously competitive item in a hurry?
6. To what extent do unrelated products indirectly compete?
7. Is your name and reputation already established among potential distributors and users with respect to: Similar products you already make? A general reputation for quality and engineering progressiveness? A general reputation for dependability, stability, honesty and fair dealing?

bet would be to diversify present lines—snow plows, gang mowers for golf courses and cemeteries, automatic lawn sweepers, for example. Lawn furniture, like lawn mowers, is seasonal. Snow plows give you two seasons.

A Moral—Many have gone ahead with new products only to learn they would have been better off concentrating extra dollars and efforts in developing present lines, says *Developing & Selling New Products*, a publication of the U. S. Department of Commerce.

Ask yourself, can I improve the profit picture by: Finding new uses and markets? Improving appearance, styling, packaging and promotion? Simplifying the product to reduce sales price? Training salesmen and dealers to do a better job? Helping or dropping the customer who can't sell? Weeding out unprofitable products?

Case II—Losing Product

In Distress—A small, single-product firm, Company B, produces quality bristle brushes for professional painters. Demand slumps sharply as do-it-yourself painting comes to the fore. Amateurs buy cheap brushes and rollers. Outlets are wholesale—large paint distributors and paint supply houses. The company has no retail experience. The sales force is small, and management's experience is confined to the quality paint brush field. Production skills are of the type handed from father to son. Management is loyal to the work force and doesn't want to change it. Capital is limited. If the company diversifies, it is pretty largely restricted to current plant and production facilities.

Findings: Under the facts, there is serious doubt whether the company is capable of diversification. Management is shortsighted. It has no grasp of the industry's marketing and distribution problems. Machinery and capital are limited. One expert says: "Sell your assets to a related company that has a successful diversification program. Otherwise, bankruptcy is imminent."

The more charitable view (that of the majority) is to have the company follow the trend or otherwise take full advantage of limited facilities. Suggestions include: A broader and cheaper line of paint brushes, other types of brushes used in quantity by industry, high-grade military, clothing, shaving and art brushes and brushes using new materials, such as synthetic fibers. Straying too far afield is the chief problem. Probably the first thing to do is hire a good sales manager who knows advertising, marketing and distribution.

8. Can your product compete favorably pricewise? Qualitywise? Performancewise?

9. What unique operating techniques can you claim? Their advantages?

10. Are competitors' products bought mainly on the strength of technical specifications? Reputation of the company? Reputation of the brand or trade name?

11. If you can't match special services, can you provide equal value by quoting lower prices or otherwise? Will the customer be satisfied?

12. Will the internal situation (reciprocal buying agreements, patent licensing agreements, trading area agreements, etc.), in the industry limit prospects?

PRICE POLICY:

1. What price policy do you plan?

2. Profit margin?

3. Do you want a big-volume-small-margin price policy or a small-volume-big-margin price policy?

4. If you are shooting at a relatively limited group, should you further reduce total potential prospects?

5. Will your price schedule meet requirements of all logical prospects?

6. Have you considered insurance costs on top of manufacture and selling costs?

7. Have you considered all transportation and other handling costs?

8. Have you considered packaging and packing costs?

9. How will installation costs affect your price policies? Distributor prices?

10. Will you service or help service? Will the user pay you directly?

11. Will you expect your distributor to help service?

12. How will performance guarantees affect your costs and prices and those of your distributor?

13. Will you sell spare parts at cost or at a profit?

14. Have you worked out a complete factory price schedule for spare parts?

15. If distributors handle spare parts, do you have spare-parts price schedules for sales to them? Suggested prices?

16. What classes of customers will get trade discounts?

17. Have you determined the schedule of trade discounts to distributors? Users to whom you may sell direct?

18. Will you offer a cash discount?

SALES FORCE AND SELLING:

1. Have you estimated direct-selling costs per unit to promote and sell?

2. If you have a sales force, can it take on your new product and do justice to it without harming the sale of your regular line?

3. If you decide to expand or change, will you need to: Increase staff? Decrease the size of territories? Give your salesmen special training?

4. Will your salesmen make closing sales?

ADVERTISING AND SALES PROMOTION:

1. Have you formulated general policies for promoting among users and distributors?

2. Do you know in detail the sales-promotion and advertising methods used by competitors?

3. Do you know the sales-promotion practices followed by distributors?

4. Will you go immediately into advertising and sales-promotion activities?

5. Are most prospects accustomed to using products of this type?

6. Do you have a plan for teaching them?

7. What engineering and design features can you stress in advertising and promotion?

8. What will be the general theme of your advertising appeal? Your opening promotional effort?

9. Do you know how much and what type sales-promotional assistance salesmen need to sell to distributors or users?

10. What general advertising and promotional support will you give distributors?

11. Have you planned sales and service manuals, parts lists, tables of shipping weights and measures, etc., for distributors and users?

12. What advertising media will you use?

Case III—The Cycle

Talent Plus—Company C makes expensive, custom-built chemical processing equipment (heat exchangers, pressure vessels, etc.). It does its own fabrication, excepting motors. The working force is technical and highly skilled in special-purpose work—several men have experience in petroleum refining and the manufacture of organic chemicals. There has been no trouble with the capital-goods cycle. Annual sales are about $25 million, but trouble inherent in the business is anticipated. The sales force, which generally goes after only the big ones, is made up of a half dozen highly-skilled sales engineers. Finances are in excellent shape, and the company wants to cash in on special skills, such as making chemicals, without changing the nature of its sales force, type of sales it makes, type of work force it has or the type of work it does. The company has no experience with mass markets, mass production or that type labor crew.

Findings: Before jumping into diversification, the company should consider subcontract work during lulls in production or sales. Another thought is that the market for the present line is narrow but growing.

Diversify, but steer clear of chemical manufacture is the consensus. Chemicals will compete with products sold by equipment customers. Petroleum products, on the other hand, are the raw materials of the chemical industry. Benzine, one of the raw materials, can be made by the present work force with equipment they can build, sold by the same salesmen to the same customers. Mass production is out of the question here.

Case IV—Idle Production

Left Behind—Company D makes coal furnaces for homes. Sales are declining, and the company, a mass producer, has a heavy investment in foundry and sheet metal working facilities. Sales are through dealers and distributors who supply building contractors. The company (in an industry of medium-sized companies) has few dealerships. Sales are regional because distribution costs are high. There is intensified competition for what's left of the market. Markets are getting hard to reach, being largely rural, where LP gas is too expensive or where pipelines are not available. Dealers are losing close contacts with contractors. The quality product is expensive, even though the market is price con-

Sources of New Product Ideas

Point at Which Idea Originates in or Enters the Organization	Source of Idea
1. Sales Force	a. Knowledge of customer needs and applications b. Inquiries from customers and prospects c. Familiarity with competitive, allied and substitute products
2. Research & Engineering	a. Modification of existing products as a result of proving ground experiments. Study of performance records. Observation of the product in use b. Application of basic research findings c. Experimental work with suppliers' new products d. By-product of work on other ideas e. Original thinking on recognized problem
3. Other Company Personnel	a. Suggestion systems b. Analysis of production processes and costs c. Analysis of maintenance and operating costs for existing products d. Analysis of markets for existing products and possible new products
4. Outside Sources	a. Inventors and industrial designers b. Stockholders c. Management engineers; marketing research consultants; advertising agencies, etc. d. Purchase of an operating company e. Import or manufacture of products being exploited successfully in foreign countries f. Trade associations and government agencies

Source: National Industrial Conference Board

scious and the cost of making a sale is skyrocketing. Finances aren't in good shape, although fixed costs are low. The plant is old and most equipment has been written off.

Findings: Management inertia again. An expert says: "This company has missed the boat. Ten years ago it was qualified for diversification . . . owners and employees would be bettered by a sale of this property or merger with a diversified company . . . due to its limited line, the company can command only third or fourth-rate dealers, where credit risks are great, selling costs high and distribution systems generally inadequate."

"There's no reason why they can't make gas and oil furnaces," is the opinion of the majority. Except for the conversion of production facilities, there seem to be no major problems. Some stump for a new business, such as equipment for the backyard chef, fireplaces, barbecue equipment, etc. Dealer-contractor distribution can be continued through suppliers of brick, stone and concrete blocks. The market is growing in sophiscated, metropolitan areas, where marketing and distribution expenses are at a minimum.

Case V—Proprietary

Evolution — Company E, a machine tool manufacturer, developed an excellent cutting fluid for its own use and now wants to market it. Finances are excellent, and the company is thinking of shopping for a small company in this business to produce and market the new product. The company's sales force has no experience with a mass-consumption item.

Findings: "Several machine tool companies tried such schemes before the last war," says one expert. "In general, such ideas were soon dropped. Industry's desire to maintain low inventories of specialty supplies would mitigate against the proposed product."

The majority okay's the company's plan. The alternative: If it has finances to assume the risk, it could produce the item itself, market through a company division, a subsidiary or an outside concern.

Case VI—Good Business

Over the Long Pull — Company F makes gas ranges. Few companies in the industry have a complete line of appliances, while the electrical appliance field is widely diversified. Sales are off. Few retailers will take a franchise. The company has the management talent, production facilities, working force and markets to expand in the appliance field, although finances could be better. Consumers have confidence in the product.

Findings: One expert thinks diversification isn't necessary. "The company should enter into a distribution pattern with a concern in a similar condition but with noncompeting products. A number of these combinations are working well." Another expert, stressing poor management, thinks the company is headed for a fall. He says: "Such a company does not have the finances necessary to properly engineer and advertise their product to compete with the large, integrated company offering a complete line."

The majority, which also decries shortsighted management, says diversify—a complete line of appliances (stoves, refrigerators, dryers, incinerators) or a growth field, such as air conditioning. With a complete line, franchises are easier to sell; you get better coverage on advertising.

Guideposts — You'll find eight common elements ran through the case histories: Product line, financial status, managerial talents, production facilities, labor force, sales staff, markets and distribution. Of course, a great deal of detail is needed to arrive at accurate conclusions (see box, p. 114).

Since the best product in the world can die on a shelf, much emphasis should be placed on sales, marketing and distribution (see boxes, pp. 116, 117).

IDEA RESEARCH DEVELOPMENT

Plan for the Development of a New Product

Step	*Departments Assisting*	*Department in Charge*
1. Idea	(submitted by any division or employee or by outsiders)	
2. Preliminary appraisal and assignment of priority	Research & Development	All departments provide data as requested
3. Literature search	Technical Laboratory; Patent	
4. Project authorization	Company Management; Research & Development	
5. Laboratory research	Research & Development	Market Research
6. Product formulation and laboratory evaluation	Technical Laboratory	Sales; Market Research
7. Technical and economic survey	Market Research	
8. Appraisal and recommendations	Research & Development	
9. Pilot plant authorization	Research & Development; Company Management	
10. Pilot plant design	Research & Development	
11. Pilot plant construction	Research & Development	Manufacturing; outside construction company
12. Pilot plant operation	Research & Development	Manufacturing
13. Product evaluation (field trials)	Research & Development	Sales; Market Research
14. Tentative commercial plant design and cost estimates	Research & Development	Manufacturing; Sales; Patent Division (Final patent review)
15. Final technical and economic survey	Market Research	All other departments as required
16. Appraisal and recommendations	Research & Development	Manufacturing; Sales; Company Management
17. Commercial plant authorization	Company Management	All Departments (Recommendations)
18. Commercial plant design and cost estimates	Manufacturing	Research & Development
19. Commercial plant construction	Manufacturing	Outside construction company; (Sales Department starts to plan sales campaign)
20. Commercial manufacture—initiation	Manufacturing	Research & Development
21. Sales introduction	Sales	Market Research; Patent Division (trademark protection); Research & Development
22. Commercial sale	Sales	Market Research; Research & Development (Sales Service)
23. Commercial plant—Process study	Manufacturing	

Source: National Industrial Conference Board

Two Rules — Now the general rule can be restated with greater precision and one more can be added. If your new product hews closely to the eight common elements, the risk is probably at a minimum. But if you run into a serious handicap along the line, use extreme caution. In this situation, many companies buy a going business that has the qualifications it lacks.

On Looking Ahead

Dreamers Wanted—You can call on diversification to haul a company off the rocks, but, ideally, new courses are charted far in advance of an emergency. In the words of W. E. Hill, a New York consultant: "Organization of the product diversification activities is a full-time and continuing task—this is specialized work—no part-time job for one or more otherwise-occupied executives."

You'll find that informed new products men have the time and freedom to explore, hunt trends. It comes as no great revelation to them that the turbine is here, that titanium is a real comer, that Americans have a crush on sports cars, that nuclear energy offers limitless opportunities to private business, that the city is moving to the country. While most of us wrestle with yesterday's and today's problems, trenders are out in the blue, 10, 20 even more years ahead of us. How do they do it?

From *Resources for Freedom*, a report by the President's Materials Policy Commission, June, 1952, you can find, for example: From 1950 to 1975 the gross national product (goods and services) is expected to jump from a yearly figure of $155 billion to about $310 billion. Over the same period, other estimated production figures are: Consumer durables, from about $15 billion to $22 billion yearly; producer durables, from about $15 billion to $22 billion yearly; total new construction, from about $12 billion to $15 billion yearly. In 1975, the population will hit about 193 million, giving us a labor force of about 80 million.

With due caution, these figures can be translated to fit your business. For example: "If the total national output of goods and services doubles by 1975 and population in-

Here Are the Experts

The six fictional case histories were analyzed by: The Engineering Economics group at Battelle Memorial Institute, Columbus, O.; International department and Office of Program Development, Armour Research Foundation of Illinois Institute of Technology, Chicago; William E. Hill Co., New York; Ebasco Services Inc., New York; McDonald & Co., Cleveland; H. K. Porter Co. Inc., Pittsburgh; Borg-Warner Corp., Chicago; Minnesota Mining & Mfg. Co., St. Paul, Minn.; and Pressed Steel Car Co. Inc., Chicago.

creases by more than one-quarter, the building industry (alone) will be called upon to produce something in the order of 35 million houses, 7.4 billion square feet of factory floor space and 4.2 billion square feet of commercial warehouse, office and store floor space, school facilities for 20 million desks and hospital facilities for 1.4 million beds." (From *Resources for Freedom.*)

Ammunition—Trends, real or potential, beget product ideas. So do your researchers, engineers, salesmen, marketing people, customers, etc. (see box, p. 118). No bet should be passed up. For it is the wise company that has a fat stockpile of ideas.

For Executives Only

Decisions Unlimited—So far the discussion has been on the judgment level: Should my company diversify? If so, in what direction? Where do we get ideas? All matters within the province of management. At this level, only one consideration remains: How do we organize for diversification? Here the concern is the delegation of duties (see box, p. 119).

Framework—*New Product Development* breaks down product development into five phases:

Ideas — Management generally plays a key role in the evaluation of ideas. Preliminary screening is frequently a standing assignment of a group or department.

Development—This group visualizes basic principles; develops and designs the final product, tests, and, if necessary, makes pilot-plant production runs.

Production — The responsibilty here is to produce the finished product on a commercial basis.

Marketing—This group introduces the product to the market and integrates it into the line.

Finance and Control—This function is carried on concurrently with the preceding four. Those involved provide funds and accounting for their use, co-ordinate and control the flow of work to guarantee the most effective use of funds.

Caution—The same publication has this to say about processing and selecting ideas: "A substantial investment of both time and money is required to develop and introduce new products. Failures are costly. Care at the selection stage, while not eliminating failures, can greatly increase the probability of ultimate success.

"One major consideration at this point, of course, is the cost of making these preliminary evaluations. This cost can range from a relatively few to several thousand dollars—to cut costs by curtailing proper evaluation will tend to result in hasty evaluations and the possibility of overlooking worthwhile suggestions or pursuing poor ones. Too liberal an evaluation policy can result in detailed study of ideas that are inherently unprofitable. Companies usually seek a balance . . ."

Direction—The publication has this to say about organization: "There seems to be no uniformity among companies as to the actual steps taken in processing new product ideas. Variations occur as a result of the size of the business, its organizational structure and the traditions and habits of the company. (Generally) emphasis shifts from sales to production to research . . .

"Yet there seems to be an underlying pattern . . . all departments are usually brought into the initial evaluation of the idea. Sales and research generally get the first look . . . after such preliminary screening, the investigation is usually broadened to include production, engineering and legal departments and any others that may have pertinent information about the idea. It is then frequently submitted to a committee of executives for further evaluation."

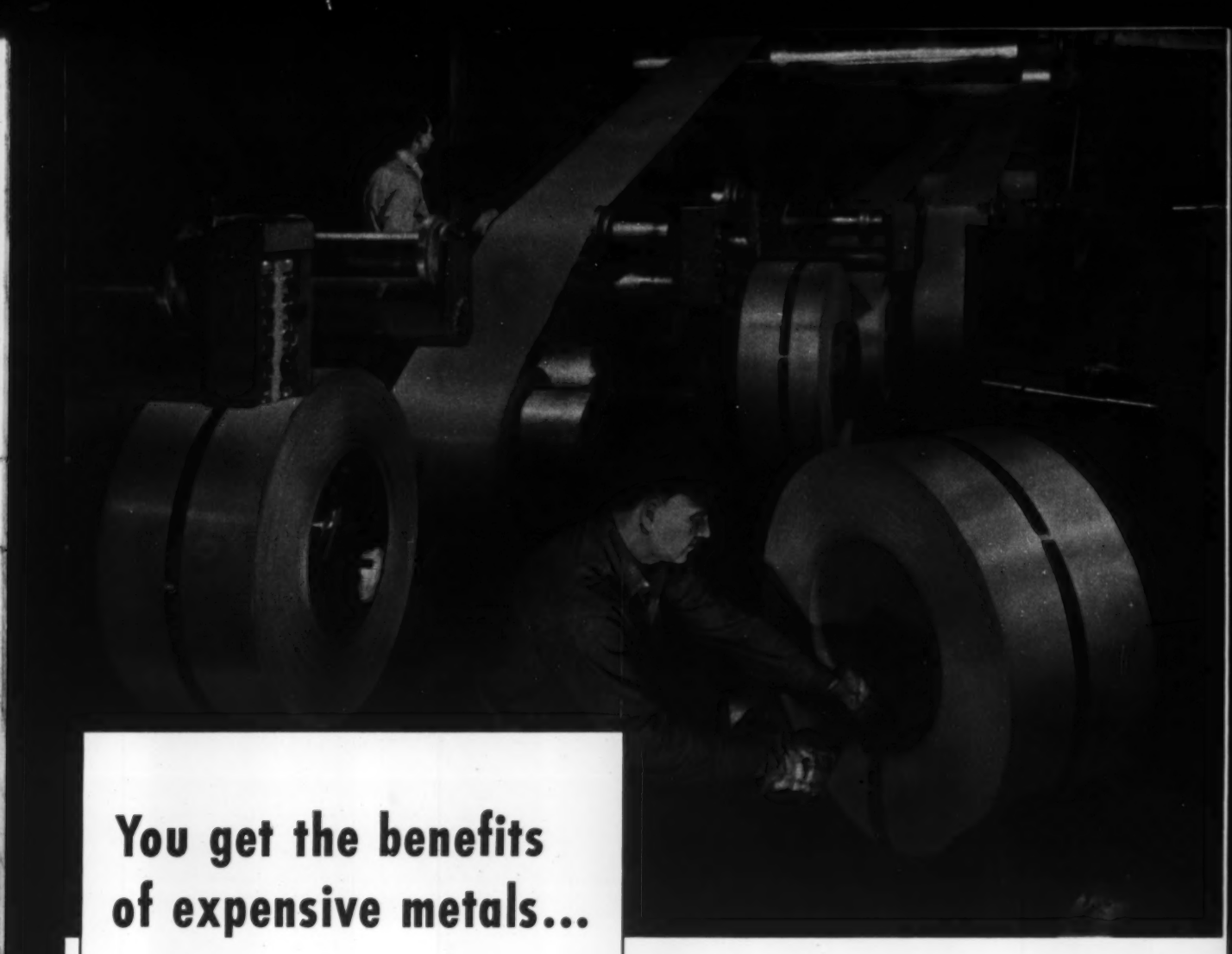
The Big Picture

One vs Many — A survey of product diversification boils down to this: "Over the long pull, is it better to be known as a specialist, a single product company, or a diversified company with a host of products?" Opinions vary all over the lot. The extremes are represented by the astute judgment of two observers.

One maintains: "How many companies of 1903 have gone out of existence—because they stuck to a product which became obsolete? Yes, in 50 years we have gone from wagons and kerosene lamps to airplanes and television . . . the really great changes stem from the creative ideas of (those) working in the laboratory, in the drafting room and in the shop. And the management that ignores what goes on there is ignoring the real things that affect the future."

While the other reasons: "It would seem that a revolution is now in progress in the diversification idea for industry. If continued, it is likely to result in each industry having three or four or five large, well-integrated, well-financed units which will set the pace and dominate the industry probably to the exclusion of the smaller units in that industry. I do not think that this is good for America."

Without disputing either gentleman, perhaps it is enough to regard adding a new product as only one of the good cards in the management deck. Of course, it is impossible to predict where diversification is taking us, but, fortunately, the trend is putting new emphasis on good, sound management at a time when it is needed.



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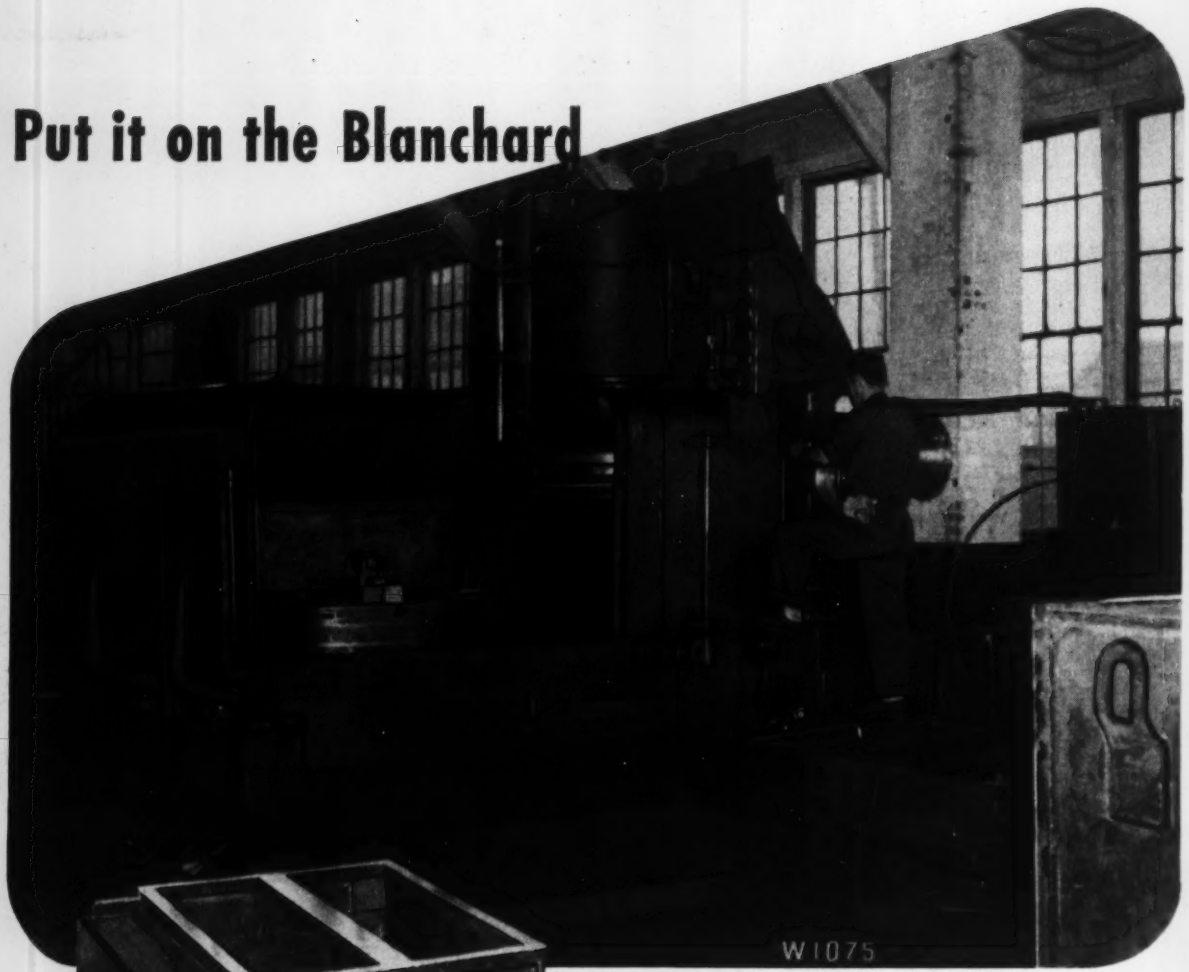


it takes 1/5th the time!

Here is another example of the special jobs Blanchard Surface Grinders perform *in less time,* to exacting specifications.

These explosion-proof control cases are used in the coal mining industry. Each steel weldment case is 36" x 48" x 24" deep. Because gaskets cannot be used, surface finish, and flatness must provide a dust and gas explosion-proof metal seal.

A Blanchard Surface Grinder, the No. 32-60, removes approximately 1/8" of stock — in *one-fifth* the machining time formerly required.

Send a sampling of your parts for free test grinding and our recommendations.

Send for your free copies of "Work Done on the Blanchard", fourth edition, and "Art of Blanchard Surface Grinding".

PUT IT ON THE BLANCHARD

THE BLANCHARD MACHINE COMPANY 64 STATE ST., CAMBRIDGE 39, MASS., U.S.A.

Technical Outlook

NEW REACTOR— Oak Ridge will build a $2.8 million high flux reactor for engineering studies. It will have a heterogeneous core with enriched uranium as fuel, use ordinary water as moderator and coolant and operate at the five megawatts (of heat) power level. Object is to develop new reactor fuels, materials and components under operating conditions.

STARTED— Speaking of modern reactors, Duquesne Light Co. broke ground on Sept. 6 at Shippingport, Pa. (outside Pittsburgh) for this country's first central station atomic power plant. Westinghouse is developing and building the reactor portion of the plant under contract to the AEC. Duquesne will design and construct the turbine portion and will operate the plant. Output will be a minimum of 60,000 kilowatts.

BEARING PERFORMANCE— Bearing loads up to 2650 pounds psi at 2750 rpm were carried by 5/16-inch diameter cemented carbide sleeve bearings in tests at the University of Illinois. Bearing and journal were made of straight tungsten carbide, with six per cent cobalt as the binder. Low friction results were reported before the American Society of Mechanical Engineers on Sept. 9.

TOMORROW'S TOOL TIPS— As the trend toward higher and higher cutting speeds continues, and as some alloys get tougher and tougher to cut, new tool materials will come along to work with. A glimpse into this future is given by the performance data of a Kennametal experimental tool material. Showing little significant advantage at low or medium machining speeds, this material gives increases up to 25 times in tool life at high speeds. Big problem so far is the tool maintenance—material is so hard, it's virtually impossible to grind. Answer may lie in small disposable tips that can be thrown away when dull.

HEAT-SENSING CELL— Little slips of glass coated with lead sulphide can give 10,000 times as much sensitivity to certain infrared rays as previous lab instruments. Eastman Kodak Co.'s Ektron detectors are simple, adaptable to manufacture in any size or shape, and indicate possibilities for developing devices based on ability to detect warm objects without contact. One use is in switches where a beam of light can eliminate a moving part. The light can come from a lamp operated so far below rated current that glow is invisible and lamp life unlimited.

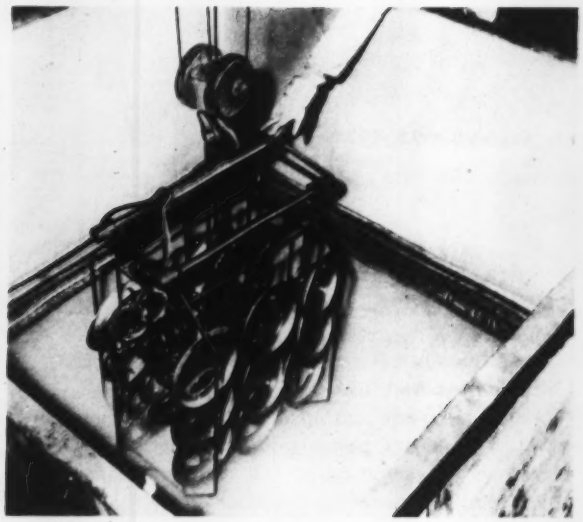
HOW CLEAN— By measuring radio-active bacteria with special geiger counters, scientists are finding out new facts about the cleanliness of metal and other materials used for food containers. Stainless steel was at the top of the list for cleanliness after washing. Stainless worn by use also had the edge over other materials.

SAND CORE HARDNESS TESTER— Hardened steel gage blades wear fast when used to test sand cores for hardness. H. W. Dietert Co. used Carboloy 883 cemented carbide tips in a new blade that lasts 90 per cent longer before reconditioning. Another result is more accurate readings.

PERMANENT MOLD— Machined graphite mold coated with an aluminum wash is the basis of a permanent mold process undergoing tests by several casting companies. Insulating effect of the aluminum wash is the essential feature. Complete runs on mold life haven't been made, but a 500 minimum is indicated.

Metalworking Outlook—p. 65 *Market Outlook—p. 175*

With better solvents and equipment . . .



Characteristic of vapor degreasing process is this final rinse in pure solvent vapor. Cleaning by this method is uniform and thorough on parts of all sizes and shapes

Vapor Degreasing Earns Its Keep

Advantages of the process are many. Savings can be substantial. Here's how to evaluate your cleaning requirements to see if vapor degreasing fits your operation

By P. R. HENDRIXSON
E. I. du Pont de Nemours & Co. Inc.
Wilmington, Del.

ALMOST every fabricated metal object must be cleaned one or more times during its manufacture. In fact, it's pretty universally true that cleaning plays an important role in the quality of the finished product.

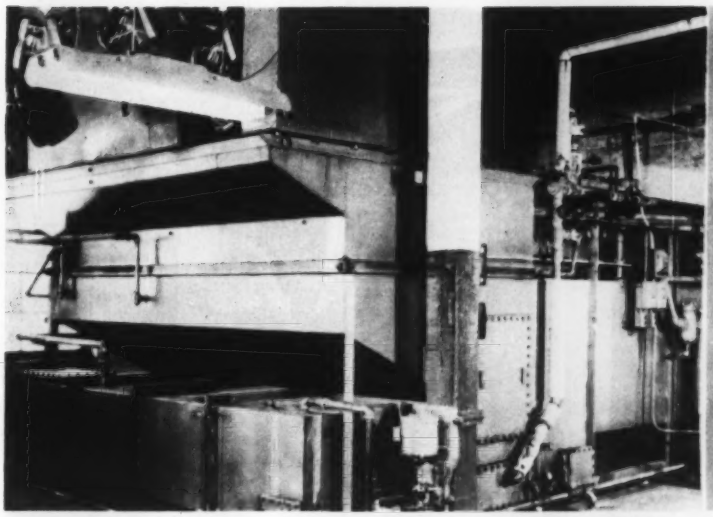
If the cleaning requirements for a product are carefully studied, most cases will disclose a "best way" of doing the job. A careful and realistic study of cost factors will disclose the method that should be used.

Consider These—The three chief considerations in installing metal cleaning facilities are: Kind of metal; type and amount of contamination, plus size, shape and end-use of the product. Estimation and understanding of the cleanliness requirement is, of course, a factor that must be first established.

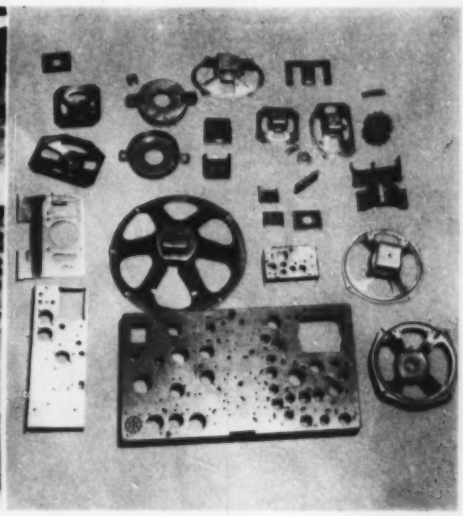
Type of Metal—Where a variety of metals must be handled on the same line, or where metals with considerable chemical activity are being cleaned, the use of solvent action instead of chemical action for removal of soil often simplifies the process. Vapor degreasing uses a nonflammable solvent to remove soluble soils. Conditions provide a uniform final rinse in pure solvent.

Vapor degreasing presents no element of overcleaning. It is entirely suitable for cleaning the more chemically active metals and for use in production lines where light metals and steels are handled. For example, a manufacturer of aluminum kitchenware would probably choose vapor degreasing for cleaning the freshly polished surfaces to sell a most attractive, bright and uniform-appearing product. If he also produced a line of stainless steel and copper ware, he would almost certainly use vapor degreasing to consolidate his cleaning line.

Type of Contaminant—The type of contaminant and amount are



Degreasing often provides maximum work throughout at lowest equipment investment. First consideration is always: Will the method do the job? Here, bathroom scales are degreased prior to painting



Vapor degreasing handles an endless variety of intricately shaped parts. These radio parts, above, must meet high standards of cleanliness

important factors. Lubricants commonly used in metal fabrication are generally soluble in vapor degreasing solvents, or in the case of buffing and polishing compounds, contain a soluble vehicle that allows removal of the compound by spray-vapor action.

If the lubricant is high in nonsaponifiable oils, or contains substantial quantities of sulphurized or chlorinated nonsaponifiable components, its removal by vapor degreasing is often a most suitable procedure. This is true because solution of soil is a physical action and is not complicated by varying chemical characteristics of such lubricants.

Increasing use of highly-fatted, sulphurized and chlorinated oils required ever improving levels of solvent stabilization. As a result of continuing progress in research and manufacture, chemical problems of solvent behavior are few indeed.

Quantity of Contaminant — Equally important is the quantity of soil. Cost of cleaning by vapor degreasing is almost independent of the amount of soil. Solvent losses in degreasing relate to diffusion from open areas, drag-out—depending on work shapes and sizes—and location of the degreasing unit.

Rapid contamination buildup in a degreaser does not affect cleaning quality, since the purity of spray or immersion solvent is substantially constant. The vapor rinse is, of course, a uniformly pure solvent. High contamination buildup in a vapor degreaser simply requires adequate use of auxiliary distillation and adequate maintenance cleanouts to maintain rated capacity. Cleaning quality and solvent consumption per unit of work volume remain constant.

A fabricator would certainly want to use vapor degreasing to clean steel stampings that are heavily covered with oil, but if stampings are only contaminated with slight amounts of oil and shop dirt, it is possible that an aqueous cleaning solution might be chosen.

First Step—This leads to the use of degreasing as a cleaning step prior to certain steel phosphatizing procedures or before the electrolytic cleaning stage in plating. A physically clean surface via vapor degreasing is frequently the best starting point for later chemical treatments of surfaces that are integral with the finish.

Buffed zinc die castings present a type of work that is readily cleaned by vapor degreasing prior to electrolytic alkaline treatment. Combination of an easily etched metal and a waxy nonsaponifiable contaminant is no problem for vapor-spray-vapor cleaning as the first preplating step.

Type of Work — Size of work pieces does not dictate the choice of cleaning method as directly as shape and rinsability of the metal part. Any of the chief cleaning procedures can be designed to take large pieces, and vapor degreasing handles a gamut, ranging from minute transistor components to diesel engine traction motors or 40-ft tube lengths.

The more important questions that can point to a need for degreasing are: "Does the work have blind recesses, sheet overlaps, or similar hard-to-reach crevices? Is the work difficult to rinse due to its shape? Is the work fragile, or is the metal surface such that mechanical movement and abrasion must be minimized?"

From a consideration of work shapes, vapor degreasing offers many advantages to the processor of complicated and fragile stampings, screw machine parts and polished work, such as castings or extrusions. Where the weight-to-surface ratio is high, the vapor action alone will often penetrate the recesses satisfactorily; and, if heat capacity of the work is low, the use of spray or immersion affords the added washing action and temperature differential for final vapor

Size and shape of work degreased is limited only by unit design. This machine, shown handling miscellaneous parts and coils, also cleans straight lengths of tubing

Conveyorized equipment handles high tonnage at low cost. This unit cleans a wide variety of intricately shaped parts without any delay for re-setup

rinse that insures adequate cleaning.

Vital Asset — The question of work shapes presents such varied aspects that it is impossible to solve by making a series of generalizations. But the man evaluating the cleaning method should bear in mind that vapor degreasing provides washing from vapor condensed on work surfaces and provides removal of pure condensate from recesses by evaporation into the vapor zone. This is an important asset in the cleaning of complex shapes.

Surface Required — Vapor degreasing provides a physically clean, dry surface. If subsequent handling is to be dry, then the dry aspect of vapor degreasing is indeed an advantage and offers a saving in processing. If the cleaned material is to be subjected to numerous visual inspections where cleaning convenience and speed of cleaning are important, vapor degreasing may best meet the requirements.

The end-use factor is closely related to the matter of the degree of cleanliness required. It must be carefully considered in planning specific cleaning operations.

Cleaning Costs — Usually, there is one procedure that will do the job best and, by doing it the best, becomes the most economical. Where a methods engineer feels he must consider individual items of cleaning costs for two processes that apparently offer equal performance, he will find little published data, and will find the job of developing his own data extremely difficult.

Aside from factors relating to quality, such as reject percentage and reworking expense, the items of metal cleaning cost can be classified:

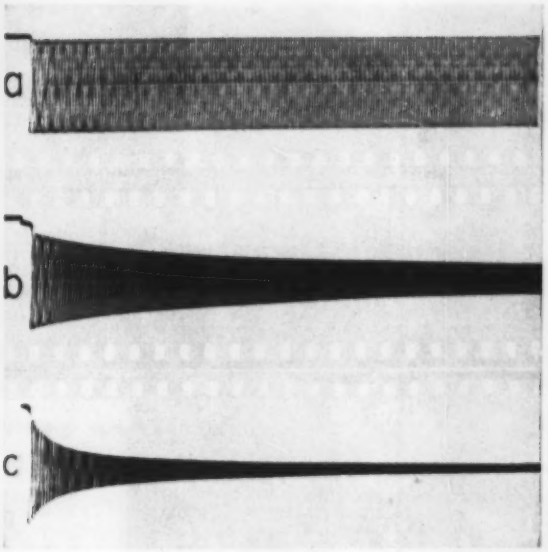
1. Investment in equipment and obsolescence factor
2. Investment in plant building area
3. Utilities
4. Overhead
5. Cost of cleaning materials or chemicals
6. Operating and maintenance labor and supplies

Weighing Costs—In general, it is probably true that the fifth item of cost for vapor degreasing is somewhat higher than for some of the other cleaning processes—for example, alkaline spray washing. On the other hand, items 1, 2 and 3 for vapor degreasing are generally considerably below other methods requiring multistage equipment, numerous pumps and motors and considerable installation room and conveyor facilities.

All these components of over-all cost are real, although frequently the cost of depreciating an investment or providing over-all shop facilities seems less apparent than does the cost of supplies purchased periodically from outside concerns.

The Future—Application of ultrasonic energy in degreaser rinse sumps is already providing a new level of efficiency in removal of certain embedded soils; right now the commercial applications handle small pieces, but great progress is being made in scaling up ultrasonic cleaning zones. Similarly, the conveyorized units now being offered for vapor degreasing can provide vapor seals and improved vapor and liquid dragout control that make possible extremely low solvents costs.

Solvent manufacturers are continuously looking toward even more versatile formulations of trichloroethylene and perchloroethylene. Perhaps in the future solvent vapors may provide beneficial metal treatments supplementing the degreasing action.



Vibration-damping records for:
(a) steel
(b) a low-damping Mn-Cu alloy
(c) a high-damping Mn-Cu alloy

J. A. ROWLAND and J. W. JENSEN
Bureau of Mines
Rolla, Missouri

MANGANESE-COPPER ALLOYS PUT DAMPER ON NOISE

High-damping alloys for machine and structural components have aided in the fight against the detrimental effects of plant noises on people and production

NEW HIGH-DAMPING alloys have taken their place alongside other "noise dimmers" on our noisy industrial scene.

They contain 60 to 80 per cent manganese, with remainder copper. The chief constituent is electrolytic manganese. When heat-treated, the material takes on damping capacity with strength properties comparable to those of structural steel. The alloys were developed for commercial production by the Bureau of Mines and the U. S. Navy's Bureau of Ships.

Typical mechanical properties are: Modulus of elasticity, 14 x 10^6 psi; yield strength, 77,000 psi; tensile strength, 100,000 psi; elongation, 8 per cent in 2 in.; Rockwell hardness, 93B. A specific damping capacity as high as 35 per cent can be obtained.

Significance—The practical significance of 35 per cent damping becomes more apparent when the method used in arriving at this figure is considered. The expression, specific damping capacity, represents percentage of total vibrational energy absorbed per cycle of vibration. The method most widely used to determine this value is based on the rate at which the amplitude of vibration decreases when the vibrating member is made of the material under test.

The physical meaning of specific damping capacity is shown in the illustration.

The photographic traces shown in this figure were made by a light beam from a mirror attached to a vibrating torsion pendulum. The three traces, A, B and C, record the deterioration in torsional vibration of a steel pendulum, a low-damping manganese-copper alloy pendulum and a high-damping manganese-copper alloy pendulum.

Capacity of the high-damping manganese-copper alloy to lessen vibrational energy is obvious from a comparison of the three traces. The specific damping capacity calculated from trace C, means 35 per cent of the strain energy at the beginning of the cycle is absorbed in one complete oscillation of the specimen.

Alloy Dampens—For comparison, gray iron, generally considered a suitable alloy for applications requiring good vibration damping, has specific damping capacity of less than 8 per cent under similar conditions of testing.

It is apparent from these facts that structural or machine components of high-damping manganese-copper alloy could have a substantial effect in attenuating or isolating vibration.

Additional tests have shown that the damping capacity of manganese-copper alloys is relatively high at all frequencies.

Here grinder is mounted on wheels for grinding welds on large plates. Unit is clamped to wheels, can be removed

Two coated abrasive belt machines are being used with an engine lathe. Grinder in the foreground is mounted to the tool post; the second grinder is suspended. The rim and face are both polished at the same time

Belt Swing Frame Grinders . . .

Versatile Tool for

By J. KARL McLAUGHLIN

Product Engineer
Behr-Manning Corp.
Troy, N. Y.

METAL FABRICATORS are adopting belt swing frame grinders to gain the polishing and grinding action of a belt. As a bonus they're capitalizing on the machine's versatility.

Belt swing grinders have been mounted on wheels and overhead rails. They have been counterbalanced to travel along a vertical surface. One model is designed to do horizontal grinding and can be turned to 90 degrees or less to do side or angular grinding.

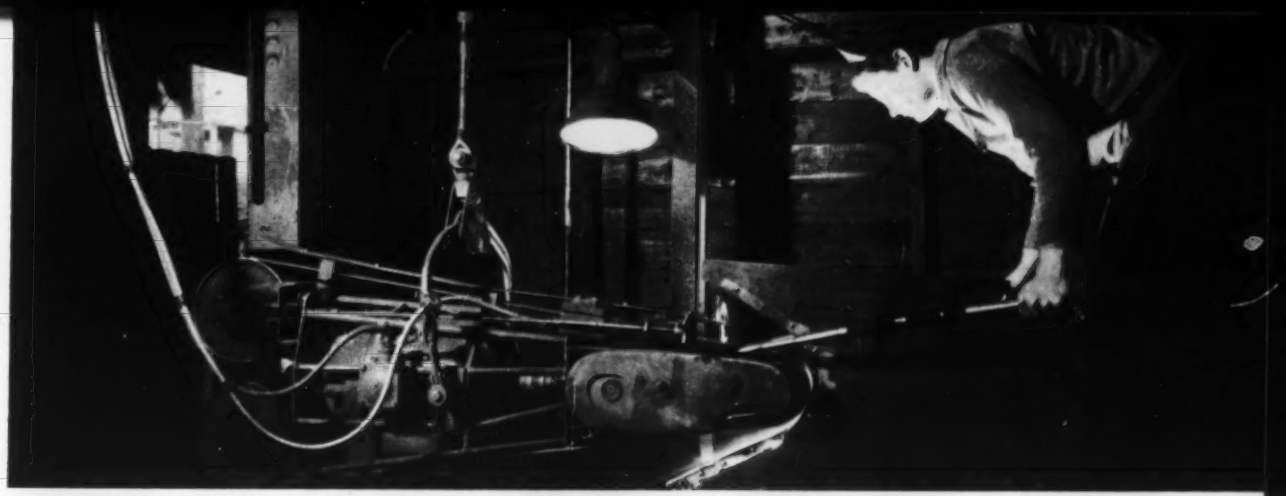
Take All Comers—The grinders have been used to grind and finish small work held in simple clamping fixtures and large work mounted on rotating fixtures. In addition, they have been used as auxiliary attachments on machine tools.

Some metal fabricators, unable to purchase exactly what they want in a swing grinder, have assembled special models for specific jobs. While the home-made machines seldom contain the versatility and strength designed into commercial models, they do illustrate how coated-abrasive belts adapted to the swing frame grinding principle will improve production rates and product quality.

Variables — Commercially-available models range from 70 to 300 pounds in weight and are powered by electric motors of 1½ to 8 hp. Belt speeds range from 5500 to 6500 sfm.

Work rolls or contact wheels, which back up the belts in grinding, usually are 6 to 11 in. in diameter and made of rubber or compressed canvas. Buff-type wheels are generally used for polishing and

Another home-made unit is hinged to the frame of a 4-wheel trolley in an overhead monorail. Motor mounted at this location obviates need for power transmission gear and puts weight where it is needed in this case



Belt swing grinder sweeps into a deep concave recess in a section of tank armor plate, grinding a weld fill

Metal Fabricators

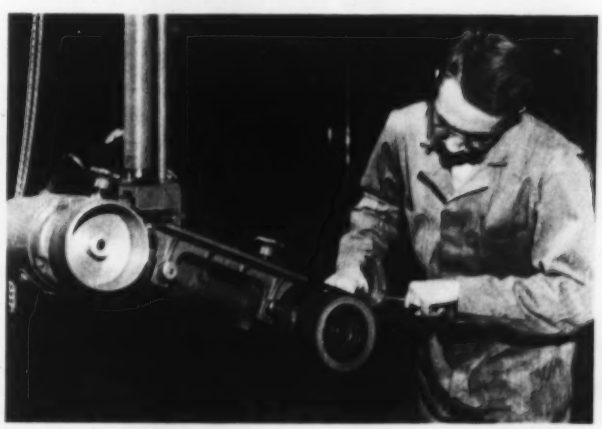
A virtual jack of all trades, the belt swing grinder tackles a wide variety of jobs. Many of the models in use are homemade. Simple controls, inexpensive setup help the boom

contour work. Belts used for weld grinding and other metalworking jobs are most often coarse grit aluminum oxide (24 to 60 grit) on X weight backing.

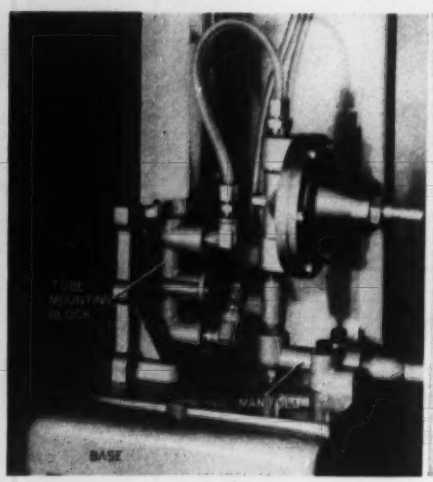
Simplified—Controls on belt swing grinders, kept to a minimum, include only the motor switch, belt tensioning and tracking knobs and, of course, the handle bars.

Speed of grinding varies from model to model according to horsepower, weight and belt. As an example, one fabricator using a 3-hp model weighing 300 pounds and a 24-grit, aluminum-oxide belt removed 18 ft of $\frac{1}{8}$ x $\frac{3}{8}$-in. weld on mild steel plate in 11 minutes. That's equivalent to about 0.28 pounds of metal per minute.

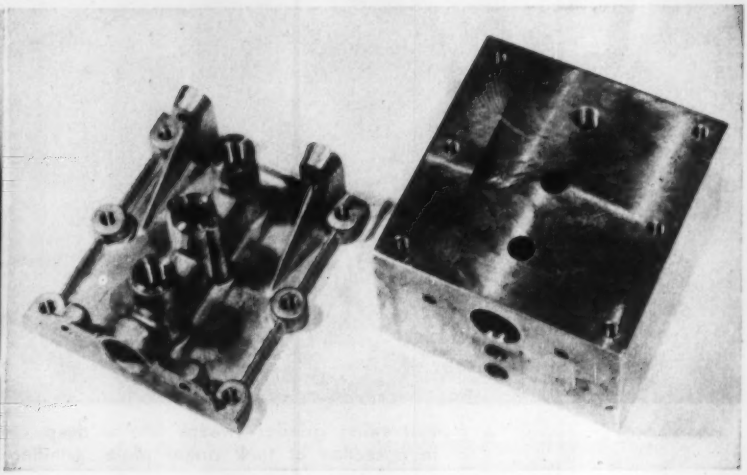
Home-made belt grinder is suspended on counter-weighted cable. Here it's removing spot welds and blending corners on stainless cabinet. Medium-density rubber contact wheel is used



Commercially-available swing grinder does both horizontal and side grinding. Unit is on a spring suspension column which eases vertical travel. Change from horizontal position is accomplished by simple adjustment



Closeup view of the single-column air gage shows the tube mounting block, base and manifold. All are zinc die castings, and all have replaced machined blocks



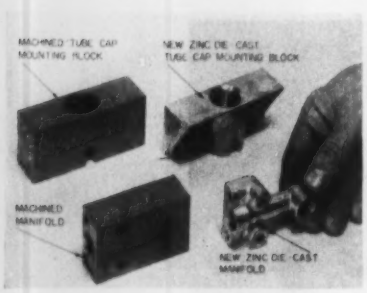
Zinc die-cast tube mounting block (left) is shown with its machined predecessor. Die casting process eliminates cutoff, milling, drilling and tapping operations

Die Castings Fit a Precision Product

Replacing machined blocks of aluminum, steel and cast iron, these die castings are helping a gage maker hold his costs down. Reduced weight is a bonus

IN A PRODUCT that literally lives by the inch, zinc die castings have exhibited the dimensional accuracy and characteristics necessary for acceptance.

Replacing parts originally machined from aluminum, steel and cast iron, they have helped Sheffield Corp., Dayton, O., hold the price of their Precisionaire air gages to the pre-Korean level, despite increased labor and material costs.


MACHINED TUBE CAP MOUNTING BLOCK
NEW ZINC DIE CAST TUBE CAP MOUNTING BLOCK
MACHINED MANIFOLD
NEW ZINC DIE CAST MANIFOLD

Die-cast manifold comes ready to use; requires no machining operations. Slight reaming of the die-cast tube cap mounting block is all that is required before it is assembled

Trend Continues — These die-castings have eliminated scores of machining operations and released a number of milling, boring and threading machines for other work.

In less than a year, successful application of die cast parts in the single-column Precisionaire alone has increased fourfold. Today, they're being introduced into multiple-column gages.

Operation Simplification — Initially, the tube mounting block was machined from an aluminum block. It required: Cutting off the metal, machining the sides, drilling and tapping 16 holes and reaming and honing the stabilizer and by-pass bores.

With the switch to zinc, the new die-cast block comes ready to use except for finish reaming of the by-pass and stabilizer holes to Sheffield specifications. Cost of the die, Sheffield says, was absorbed in the savings accruing in about the first 5 months production of this part.

Ready to Use—Similar savings are experienced with other die-cast parts. The old-style manifold, machined from steel, required cutting off, milling, drilling and tapping four holes and drilling two mounting holes. The die cast manifold comes ready to use.

Another large savings in costs and machining time occurred in changing the gage base from cast iron to die cast. No barbering or machining operations are required. The new base is delivered ready for assembly.

Less Weight — Located at the top of the gage is the tube cap mounting block. Previously cut from a block of steel, it required machining, drilling, tapping, reaming and honing. The die-cast part comes ready to use except for a slight reaming of one of the holes.

Important, too, is the reduction in weight of zinc parts over iron and steel, making it more convenient to move them from one place to another. Also, each die-casting is identified; the part number is applied during casting operation.

4500 per hour per machine!

You can't beat Revere Free-Cutting Brass for speed

The mounting nuts shown here are made by the Fischer Special Mfg. Co., Cincinnati 6, Ohio, out of Revere 9/16" hexagon Free-Cutting Brass Rod. Output is 4500 per hour per machine. This phenomenal rate of production is due to special adaptations of standard machines according to Fischer designs and the high quality of Revere Rod. These two important factors enable Fischer to compete price-wise with nuts produced by other methods.

Fischer nuts are chamfered and countersunk on both sides, have no burrs, and are made in sizes from 1/8" to 1-1/16", in various designs, such as hexagon, cap, thumb, spark plug terminal, lighting fixture. As a further indication of the efficiency of the Fischer operation it can be reported that during 1953 the company averaged 244,897 pieces per running hour.

If you machine brass, look into the virtues of Revere Free-Cutting Brass. See the nearest Revere Sales Office.

FISCHER WAFER or mounting nuts, made from Revere 9/16" Free-Cutting Brass Rod at a rate of 4500 per hour.

Revere Free-Cutting Brass Rod has speeded production for many firms, and saved them money.

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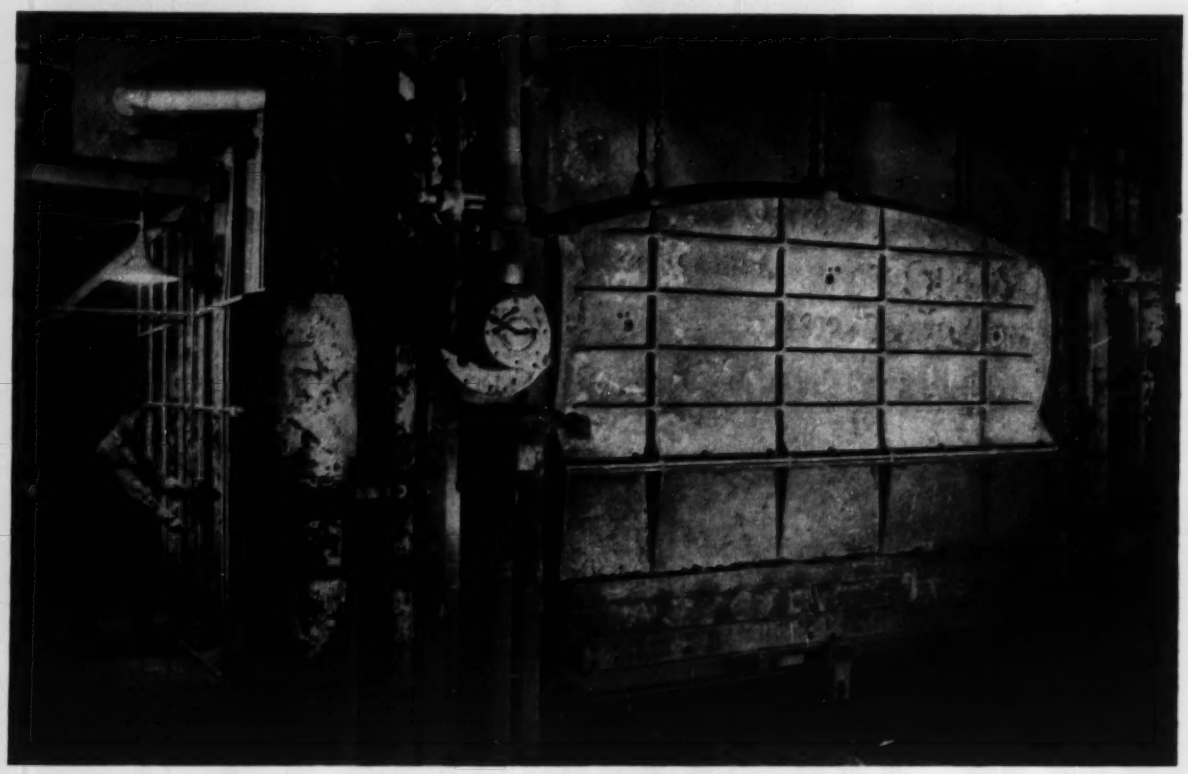

Furnace in which mill rolls are annealedis equipped with two combination burners

Rotaflame Burners Heat Rectangular Furnace

Whirling flame in heating chamber does not allow temperature differences to exist. Soft spots on the surface of steel mill rolls are eliminated during annealing cycle

By W. TRINKS
Consulting Engineer
Pittsburgh

IMPARTING uniform temperature to the charge is the purpose of heating furnaces, although many do not meet this requirement.

For example, a car-type furnace for annealing large rolls to about 1800°F was built with a multitude of small burners in the sidewalls near the hearth and a correspondingly large number of vents a short distance above the hearth. The annealed and cooled rolls developed soft spots that were traceable to hot spots in the furnace, proving that a multitude of small burners does not necessarily result in a uniform temperature in the charge.

The trouble was traced to the manipulation of the multiple burners. Pyrometers indicated the same temperature, and a perfect temperature chart was produced. Temperatures were equal in the immediate vicinity of the thermocouples but not the same at other points in the furnace.

Employs Rotaflame Burners—Engineers of Steel Processing Co., Pittsburgh, recommended scrapping all small burners, accessories and piping, and installing two large burners of the Urquhart type. The circulating atmosphere produced would whirl around the furnace interior. The whirling flame, or rotaflame, has been used in circular furnaces for over 30 years, but its application to long rectangular furnaces is not common.

Two Urquhart combination gas and oil burners at diametrically opposite corners fire along the longer walls. The burners are supplied with air and fuel (gas or oil) from a single Urquhart

Heavy Duty ROLL GRINDERS

Designed and Built by MESTA

Mesta Heavy Duty Traveling Wheel Type Roll Grinder
Finishing a 59" x 154" Mesta Backing-Up Roll

DESIGNERS AND BUILDERS OF COMPLETE STEEL PLANTS

MESTA MACHINE COMPANY • PITTSBURGH, PA.

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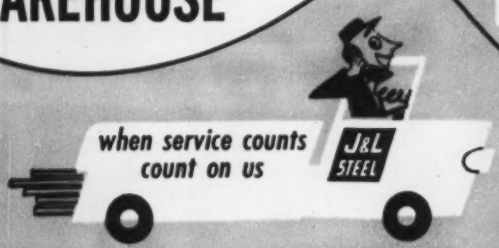
J&L STEEL WAREHOUSE



for a complete line of steels

SPECIALS: Jalloy (High Strength—Abrasion Resistance) Jalten (High Strength—Good Formability—Abrasion Resistance) Junior Beams • Junior Channels • Jaltread Floor Plate • Tool Steels • Stainless Steels.

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for service that solves your problems

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FABRICATION SERVICE: Shearing, forming, torch cutting, blanking, to *your* specifications.

J&L STEEL

Jones & Laughlin

STEEL CORPORATION—*Warehouse Division*

furnace atmosphere control, which proportions air and fuel in any desired ratio. Control is readily adjustable between a deficiency of air and a large quantity of excess air. In the latter case, only enough air is admitted to the inner combustion chamber to maintain combustion without flame failure. The bulk of the air flows through the holes in the outer ring.

Air-Fuel Ratio — When a solid piece (one not consisting of loose material) is cold charged, flame temperature may be high. Heat is conducted quickly from the surface to the interior of the charge. With a cold charge, danger of local over-heating is small. As the charge acquires temperature, excess air is increased; the temperature of the products of combustion is lowered, until it finally lies little above the desired final temperature of the charge.

Obviously, the final amount of excess air is dictated by the final temperature of the charge, which may be as low as 300°F, and the nature of the fuel. Blast furnace gas having a low adiabatic flame temperature, needs less excess air than required with richer fuels. Excess air "tempers" the flame.

Gas Recirculation Unfavorable —It would have been impractical to convert the furnace to recirculation of furnace gases, although recirculation consumes less fuel than excess air requires. Fans and blowers that operate successfully at 1800°F are not available. Recirculation also requires a large well - insulated combustion and mixing furnace for which no floor space was available. Recirculation needs power for the blower and water for cooling its bearings.

The result of introducing excess air into furnace is fourfold:

1. Flame temperature is lowered; both radiation and convection are reduced.
2. Air does not radiate, to reduce radiation even more.
3. Excess air increases the mass or weight of the gases that are projected into the furnace and increases the ability of the gases to penetrate a greater distance into the furnace.
4. Excess air increases the volume that has to pass through the existing ports, and increases furnace pressure. Cold air cannot leak into the furnace through the sand seal.

No Temperature Differences — In the converted furnace, temperature control is accomplished by pyrometers in the usual manner. with the assurance that the lively circulation of the furnace gases does not permit harmful temperature differences to exist in the furnace. A test run is made during which the temperature in the interior of the roll is measured in addition to measuring furnace temperature.

Time required for bringing the interior to the desired final temperature without overheating the surface is measured while furnace temperature is kept slightly above this value. After completion of the test run, a heating cycle is set for duplicating the performance. The converted furnace utilized the numerous, original small vents.

Elevation Is Essential—For obtaining uniform temperature in rolls, shafts, turbine rotors, or other pieces being heated, the stock must be elevated above the hearth and the supports or saddles must be so designed that they do not produce cold spots in the charge. Furnace gases in their travel slow down and flow through increasingly larger cross sections. This action, coupled with the location of the vents, causes gases to flow down to the hearth, but does not compel them to flow uniformly under the charge.

If the supports are high, direct radiation from the sidewalls and reradiation from the hearth combine to produce a uniform temperature in the charge. The new method of heating is well suited to heating of round bodies. Radiation from sidewalls easily can reach the hearth. If thick slabs are to be heated, they must be narrow in comparison with the width of the furnace.

The method of heating adopted in this conversion is not effective for every annealing operation. But it has been profitable for the owners of the furnace because it eliminated the expensive soft spots. The same method of heat application also has been used in pit furnaces where the vents in the hearth are judicially arranged.

Tube Pipes Hot Steel

Giant ceramic pouring tube that stands up under extreme temperature changes to be used for pressure casting method for carbon steel was developed by Electro Refractories & Abrasives Corp. Steel is poured in graphite molds, compressed air forces it up through tube to mold cavities—6-foot tube used at Griffin Wheel Co. for railroad freight wheels. Temperature will go as high as 2000°F

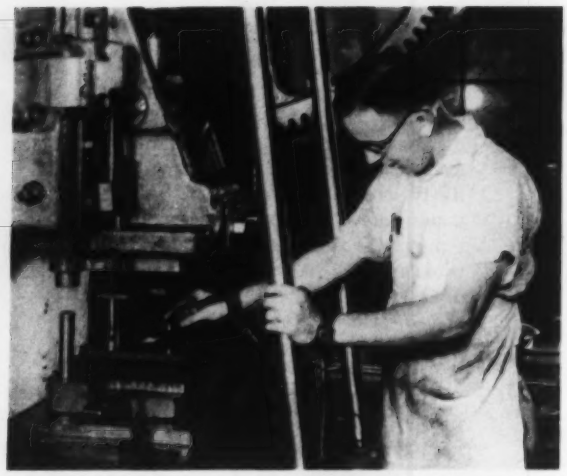
Hot Barrel Dries Paint

RECONDITIONED steel barrels are heated before paint is applied at Barrel Remodeling Co. The heated mass dries the paint from inside out in 15 minutes as compared to three or four hours previously required for air drying.

Barrels are placed on revolving rollers so heat can be applied uniformly and rapidly before spray painting. Six Chromalox radiant units are arranged to form a compact open-end radiant tunnel. High intensity all-metal far-infrared electric heaters are used.

Before and After—The barrels are heated to a temperature of 175° F in 30 seconds. They are then placed on end spinners in the spray booth for an even coating of paint. Paint adheres well to the preheated barrels. There is no blistering and paint dries fast and evenly.

Advantages — The preheating saves in drying time. The drying step no longer limits the rate of production. Considerable amounts of paint are saved since heat appears to reduce the viscosity, minimizing the tendency of coat to be thicker in spots or to run at certain places.



Standard 135-ton press operated with 60-per-cent overload to pierce SAE 4130, ⅝-inch steel. Stainless tie rods are needed to take the load

They Said This Was Impossible

They're punching a rectangular hole in ⅝-inch thick 4130 chrome-moly steel and getting away with it. Production is 100 an hour. Shaving finishes the job

IN ONE BLOW, a ¾ x 1 5/16-inch rectangular slug is punched out of SAE 4130 chrome-moly steel. The blank is ⅝ inch thick. Production is 100 parts an hour.

The previous method included drilling two holes in the part, and then broaching the rectangular slot. It took about 12 times longer than did the punching method.

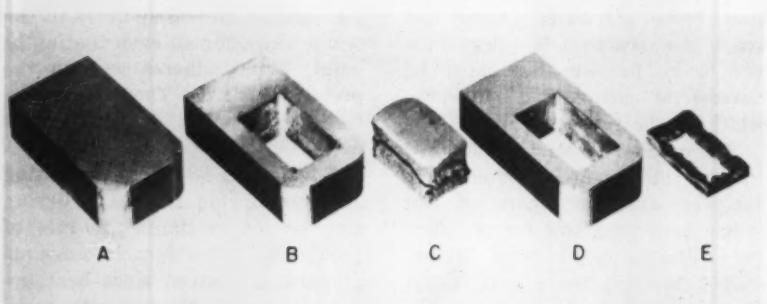
Tough Stock—Steel stock used for this job has a tensile strength of 103,000 psi, yield strength of 85,000 psi and a 15 per cent elongation.

The chemical analysis is: C 0.29, Mn 0.54, P 0.017, S 0.030, Cr 0.96, Mo 0.18. The job is being done at Gunver Mfg. Co., Manchester, Conn.

The punch for this severe operation is of high-carbon, high-chrome tool steel. It's heat treated to 59-60 Rockwell C. The punch has a 0.0015-inch back clearance in about 1½-inch length. Clearance between the punch and die is 0.025 inch on a side. Deformation of workpiece walls is held to ± 0.001-inch. Oakite No. 12 is the lubricant.

Finishing—After the slug is knocked out, one or more shaving operations may follow to finish the hole to size, clean up the hole surface and to cut the corner radii to size (0.040-inch, ± 0.002).

A standard, 135-ton, mechanical press is used, operating under a 60 per cent overload for this operation. Standard tie rods have been replaced with special rods of stainless steel to support the high loads.



Blank (A) is first pierced (B) and then the hole is shaved (D) to bring wall finish and tolerances, plus corner tolerances, up to standard. Also shown in the picture are the pierced slug (C) and the shaving chip (E)

(Advertisement)

How Do Lightweight Refractories Cut Fuel Costs And Boost Furnace Output?

Here, certainly, is a timely question. There's a heavy squeeze today on most furnace operators for lower costs, larger production . . . or both. And despite all the economies they've put into effect so far, they're still searching hard for ways to make their furnace dollars do a bigger job.

The following discussion brings out a number of facts, often overlooked, about the money-saving, profit-building potentials inherent in *lightweight* insulating firebrick.

Q. *First of all, just what do you mean by "lightweight" insulating firebrick?*

A. Compared with dense, fireclay brick weighing approximately 7½ to 8½ pounds each, insulating firebrick range from about 4½ pounds down to slightly over 1 pound for various temperature requirements.

Q. *What does this light weight have to do with lower production costs?*

A. Briefly, heavy furnace linings waste your fuel dollars two ways:

They soak up and store large quantities of heat which are lost when the furnace is cooled; and they conduct and lose too much heat through the wall.

Lightweight insulating firebrick, on the other hand, contain millions of tiny air cells, heat up and cool quickly, absorbing and storing very little heat. Also, they resist heat flow, keeping it inside the furnace to do productive work.

Q. *I can see why you would save on fuel — but how much?*

A. There's no single answer to that question — there are too many variables to be considered. But to give you an idea of these savings, here are a few actual examples:

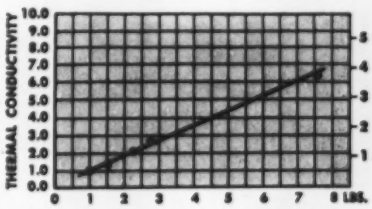
The operator of a large forge furnace cut his fuel costs more than 50% after changing to *lightweight* insulating firebrick.

A manufacturer of electric kilns states that insulating firebrick result in heat savings of fully 25%.

A magnesium melting crucible furnace that formerly used 1,000,000 BTU's per hour now does the same job with 500,000 BTU's, thanks to insulating firebrick.

Q. *Increased production has also been pointed out as an advantage of insulating firebrick. How do you explain this?*

A. Again the answer lies in lightness of weight. Because lightweight firebrick store and conduct less heat, they come up to operating temperature faster — cool down faster, too. This means — shorter heating cycles.



Relation between weight and thermal conductivity for several brands of kaolin base refractories. (mean temperature, 900F)

Secondly, because lightweight firebrick conduct far less heat than heavy, dense firebrick, you don't have to build as thick a wall. This gives you more hearth area per square foot of floor space.

Thirdly, lightweight firebrick respond more rapidly to changes in furnace heat input, which means closer temperature control and fewer rejects in many instances.

It's just like adding extra furnace capacity without adding to your furnace investment.

Q. *Are there any differences in the performance of the various brands of insulating firebrick available?*

A. Naturally, the *lighter* the brick the greater the fuel savings and furnace output. And the lightest insulating firebrick of all, for any temperature range — if you'll pardon our mentioning it — are B&W Insulating Firebrick.

THE BABCOCK & WILCOX CO.
Refractories Division
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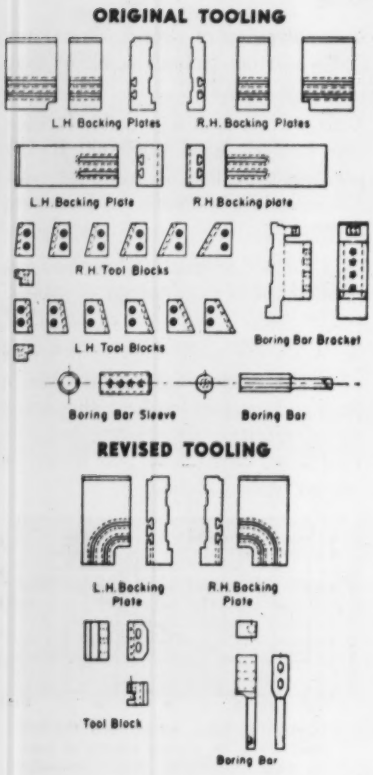
161 East 42nd St., New York 17, N. Y.
Works: Augusta, Ga. R-808

Design for Production Savings



STANDARDIZATION and simplification of tooling, plus a change of sequence on job operations accounted for savings of $100,000 in three years at Spicer Mfg. Co., division of Dana Corp.

In several production areas, for example, tooling changes were made on machining of 12 gears.

Requirements — Original tooling used on an 8-station vertical spindle machine (to drill, turn, face, bore and ream gears) had to be removed, matched and replaced for adjustment.

Involved in the original tooling were: Six backing plate designs, three right and three left; 12 tool block designs, six right and six left; two drill brackets; two boring bar brackets; and one reamer bracket.

Backing plates had vertical or horizontal T-slots attaching tool blocks. Adjustment was limited to one direction. Tool blocks were made with an angular slot corresponding with the cutting angle of the tool bit.

Revised — Now gears are machined on the same 8-spindle machine—two backing plates, one right and one left; two drill brackets; one reamer bracket; one tool block. Plates, blocks and bits need not be removed from the machine for adjustment.

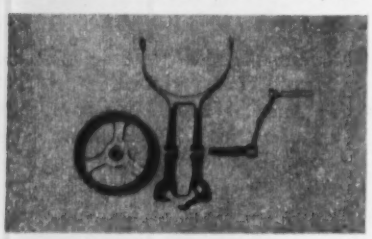
Radial T-slots in backing plates enable mounting of tool block at any angle. Tool bits with removable carbide inserts may be used. Boring bar is attached to backing plate in the same way as the tool block.

Standardization and simplification have increased employee production, reduced setup time, decreased tool maintenance and reduced production costs.

In this operation, individual gear designs are produced in relatively small quantities, which automatically require frequent setup changes.

Better Beater Casting

Improved zinc die cast increases gear wall thickness and draft at end of teeth, cutting number of rejects



Parts are copper, nickel and chrome-plated, then polished to obtain maximum beauty and sales potential

A SMALL CHANGE in a zinc gear die casting solved a production problem for Turner & Seymour Mfg. Co.

The company markets an egg beater that has three zinc die castings: The main frame, the crank and the driving gear. The gear posed the problem.

Why—For sales appeal and for longer life, the die-castings are chrome plated. Since many cast gears were not free of surface blemishes, excessive time had to be spent in plating and polishing them. Production costs were high.

Precision Casting Co. engineers decided that the shroud encircling the gear was unnecessarily thin; that this accounted for pin holes, porosity, heat marks, the cold shot.

Some of the zinc apparently solidified before completely penetrating into the thin outer rim, thus preventing it from being entirely filled. To solve the problem, engineers redesigned the die cast.

Engineers built different dies to increase wall thickness and draft at the ends of gear teeth. Together with better venting and gating practices, the dies have upped production rates. Rejects, despite a highly critical inspection of buffed parts, dropped noticeably as a result.

Operations — After gears and cranks have been electrolytically cleaned, they are rinsed and dipped in acid. Parts are copper, nickel and chrome-plated with suitable rinses between three successive coats. Beater frames are plated in the same way.

Denseness achieved would not normally require mechanical finishing, but they are polished to improve sales appeal.

Sure, Westinghouse drives helped us lick a couple of quality problems

The following pages show how Westinghouse matched apparatus and engineering assistance did it

MOTORS cut rejects on a stamping operation
CONTROLS made our job more automatic
GEARMOTORS eliminated service headaches

Coordinated Westinghouse equipment cut our stamping rejects

Working to the customer's own requirements, Westinghouse engineers link electrical equipment with new ideas in metal fabricating. Here is an improved manufacturing process and the coordinated Westinghouse apparatus that makes it go.

Coating machine (pictured at right) covers sheets with a special compound to prevent the sheet's sticking during stamping and forming operations. It's quickly brushed, cleaned, sprayed and dried. The percentage of stamping rejects drops off because the sheet can slide in the stamping machine without tearing. There's less chance of scoring the die, too. Westinghouse provides all the equipment to power machines like this.

New Life-Line® "A" motors are designed with the user's toughest application problems in mind. In addition to its compactness, the new motor has a fortified insulation system, with high thermal stability and resistance to moisture, oils and chemicals. On-the-job greasing isn't required, thanks to the "A" motor's 4-way seal and pre-lubricated bearings. Armorized cast-iron frame provides a housing that stands up to corrosion and physical abuse. Straight-through ventilation makes the Life-Line dripproof regardless of its mounting position.

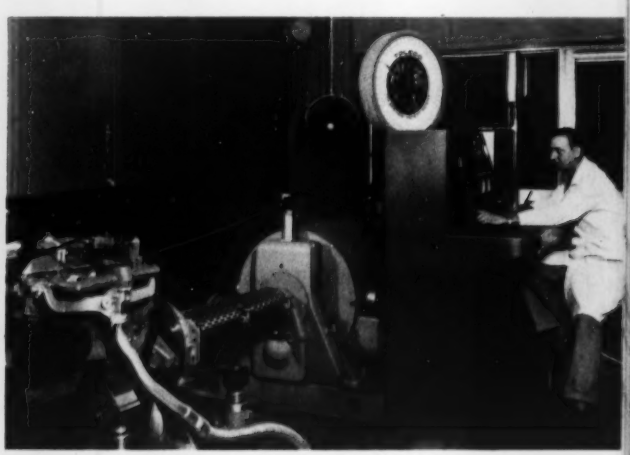
Control panel (bottom of page) features Westinghouse components, carefully coordinated in another automatic cleaning process. Seven Life-Line Starters protect the motor against overloads. A Westinghouse F frame circuit breaker, located in the upper left corner, protects both the motor and control against short circuits. There's a safety interlocked handle mechanism on the enclosure cover. In sharp contrast to starters of conventional armature design, Life-Line Starters seldom require attention. The exclusive Westinghouse knife-edge bearing design drastically reduces friction and wear.

Westinghouse gearmotors have the motor mounted directly on the gear case. This integral design rids you of time-consuming coupling alignment or repair. Exclusive horizontal split case provides a simple, speedy maintenance advantage. Remove a few bolts, lift the gear cover, and all gearing parts are free for removal or inspection. You don't need to drain or disturb the unit's mounting or coupling to the driven load.

YOU CAN BE **SURE**...IF IT'S

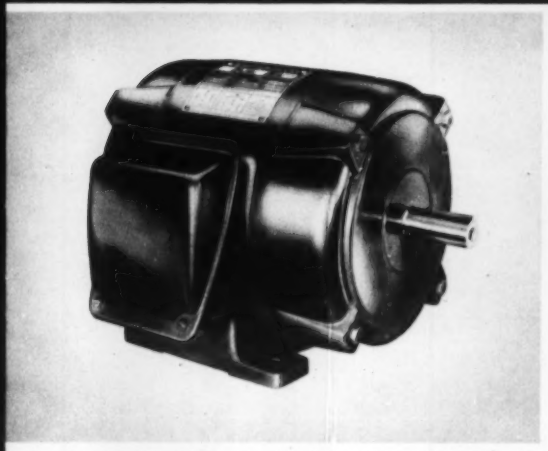
Westinghouse

Control panel, outside a dust-tight room, operates shot blasting against forgings to knock off flashings and scale. Westinghouse control handles the sequence from start to stop. When it finishes, it's ready to go again—automatically.

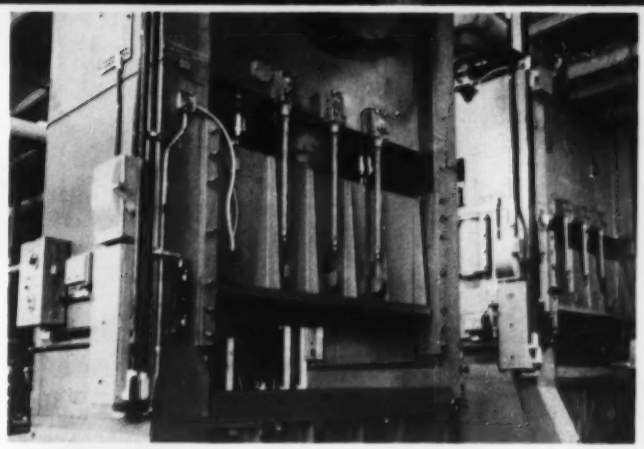


Dynamometers measure output or input torque and horsepower. Westinghouse makes them—rugged but sensitively accurate—with rolled steel stator frames, dynamically balanced armatures, and hydrodynamic trunnion bearings.

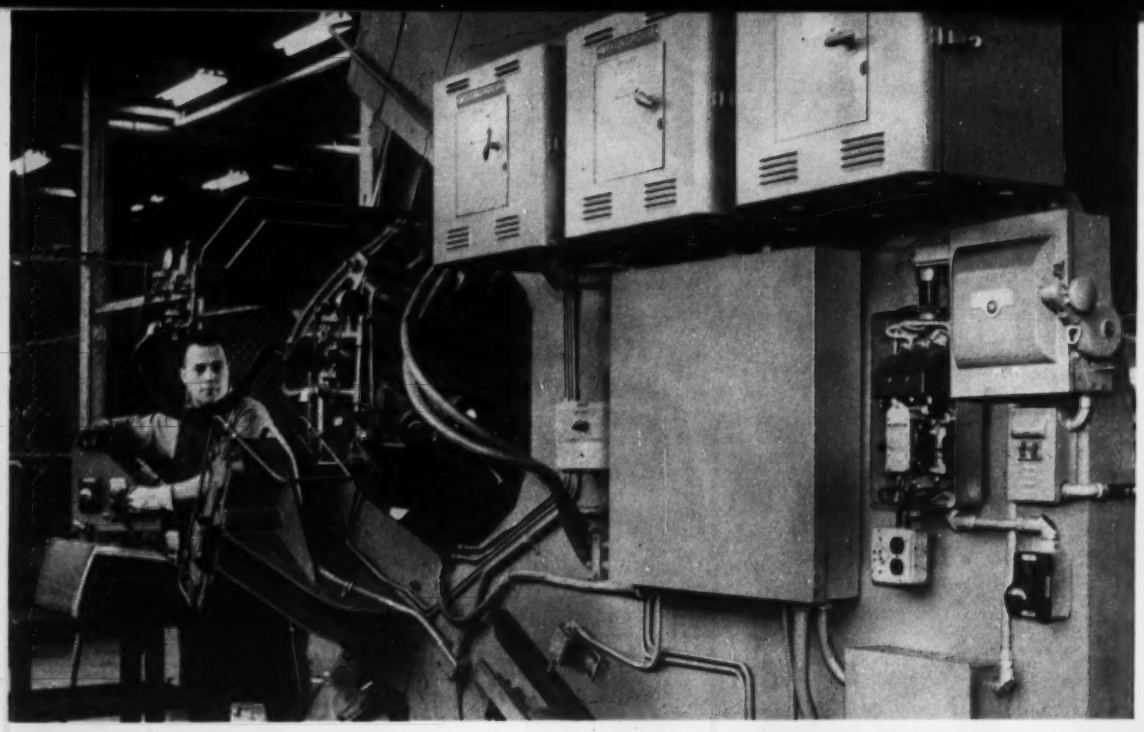
Teamwork among Westinghouse 3-hp Life-Line gearmotors (11 of 'em) and starters helps this coating machine prepare sheets for stamping. Westinghouse engineers planned the installation to meet the customer's ideas and requirements.



New Life-Line "A" motor has frame, feet and end brackets of heavy cast iron. Other new Westinghouse features: Bondar insulated wire; Bondite impregnating varnish; unitized stator; balanced, die-cast rotor.



Westinghouse press control improves the output on this stamping press—next job after the coating machine. Westinghouse controls handle each step progressively, automatically, after the operator punches the start button. Safety switch is located at upper right.

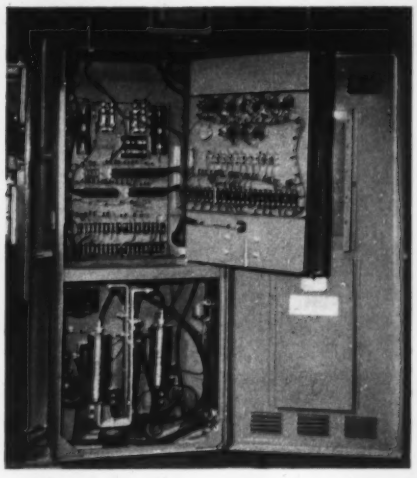


Westinghouse Weld-o-trols improved our welding operation

Westinghouse resistance welding electronic controls are used for precisely timed welding. They handle thousands of amperes. Resistance welders, like the one above, make vacuum-tight welds on every operation. They maintain the correct weld time period day after day, making millions of spot welds without the need for readjustment or mechanical maintenance.

Keep your production going and save you money—those are the twin goals of Westinghouse complete maintenance service. 38 Repair Plants, superbly equipped for repairing all types of electrical apparatus, are at your service. 31 Renewal Parts Warehouses are strategically located in industrial centers. 46 Field Service Offices make on-the-spot repairs of equipment that can't be moved. Call your Westinghouse Representative for these services. Westinghouse Electric Corporation, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

MP 3011



Electronic resistance welding controls are protected by a 600-volt ABI circuit breaker and control the complex welding operation. The operator works the start-stop buttons. There's a safety switch below the control box.

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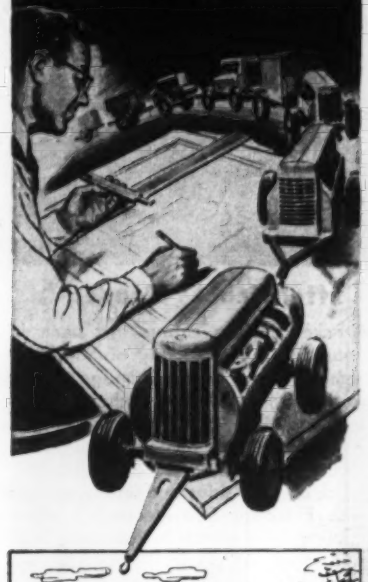
. . . engineered for greater field performance!



CARAVAN engineers consider the facts! No matter where your product is rolling . . . in open fields, on hazardous rain-soaked roads, through extreme cold . . . you are assured of dependable performance when it is mounted on CARAVAN Axles.

Designed and engineered for load stability, CARAVAN Axles provide a massive, heavy-duty steering arm . . . extra-heavy center arm stop blocks . . . heavy-duty steering knuckle . . . and precision ground spindles. These quality engineered assemblies guarantee positive trail at high speeds as well as stability for your equipment over the roughest terrain.

For engineered superiority specify . . . CARAVAN Axles.

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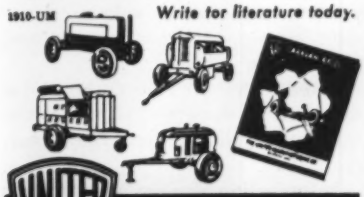

UNITED MFG. COMPANY

919 INTERSTATE ST. • BEDFORD, OHIO

Press Forms Aircraft Parts

A press specially designed by Convair to handle three-eighths inch aluminum alloy stock or its equivalent can handle maximum size of stock 6 x 22 feet or it can stretch a piece 6 feet x 4 inches. Twisting and stretching is done by four giant jaws, working in pairs. The 750-ton capacity press weighs over 400,000 pounds and rests on reinforced piers in drop hammer room

Ultrasonic Cleaner

AN ULTRASONIC CLEANER unit operating with either water-soluble detergents or cleaning solutions and featuring the lower-frequency, magnetostrictive transducer, achieving high penetration of ultrasonic energy, has been developed recently by Bendix Aviation Corp.

Why Ultrasonic? — Tests have shown that this processed parts cleaner will save up to 90 per cent of costs for solvents and more than half the direct labor costs for existing methods of industrial cleaning.

The development operates by transmitting ultrasonic waves through inexpensive detergents or other economical cleaning solutions which surround the parts to be cleaned. The ultrasonic energy forces the solution to cavitate, or cold boil, with countless minute bubbles.

Bubble Busts — These bubbles implode and literally blast particles of grease, grit and other foreign matter loose. It reaches even the most inaccessible recesses of precision parts and cleans metals,

THERE'S A DIFFERENCE IN *Yellow Strand* WIRE ROPE

Keep a record of the service life of the wire rope you're now using on your cranes, hoists or other lifting devices. Mark the date the rope is installed and the date when it first shows wear.

Then try just one order of Yellow Strand Wire Rope and record its life. You'll see a difference in wire ropes and you'll see how ordinary ropes are cutting into your profits.

Yellow Strand gives you more service because it's made of highest quality steels, precision-fabricated into tough strands and tougher ropes. Yet flexibility and handling ease are retained.

Try just *one* order of Yellow Strand Wire Rope — call your Broderick & Bascom distributor today. His name and address will be sent on request.

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Specify *Yellow Strand*
For Safety • Savings • Speedi-Service

glass, rubber, plastics, ceramics and other materials.

To be produced by the Pioneer-Central Division, it will be manufactured in diameters of 4, 7½ and 12 inches, each with a depth equal to its diameter. The three models, according to engineers, will fit the needs of a broad segment of the precision products industry.

Merchant Bar Rolling Mill

INSTALLATION of a 12-inch merchant bar rolling mill by Vanadium-Alloys Steel Co. completes the first phase of a program designed to modernize their rolling mill facilities.

The mill was designed and constructed by Lewis Foundry & Machine Division, Blaw-Knox Co. Included in the installation: One 12 x 41-inch, three-high roll stand; three 12 x 16-inch and one ½-inch, two-high finishing stands.

Installation also includes one 12-inch, three-high pinion stand equipped with roller bearings. The equipment was installed complete with annealed cast steel closed top roll housings, top and bottom housing separators, manually-operated top and bottom roll adjusting mechanism, actuated through forged steel screws and bronze screw boxes by reversible ratchet wrenches.

Cutter Cracks Mended

Cracked milling cutters are back in operation the same day damaged at Temco Aircraft Corp. Damage usually results from milling machines feeding too fast or biting too deep. Pieces of cutter are fitted together, secured, tacked, grooved along the crack on both sides and finally welded with Eutectic's 680 electrode. After cooling, the weld is ground flush and tool is again ready to use

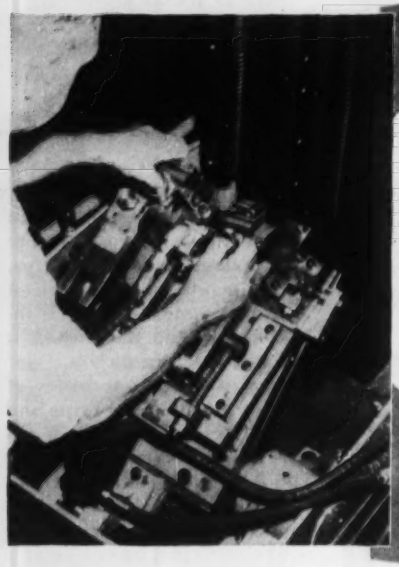
Slide-Lecture Program

A four-color slide-lecture program, designed to broaden the understanding of the operation of hydraulic components, has been completed by Denison Engineering Co. Slides are to be made available for use in colleges, engineering societies, company training programs etc.

The lectures cover: Axial piston pumps and motors, vane pump motors, directional valves, surge damping valves, flow controls and hydrostatic valves.

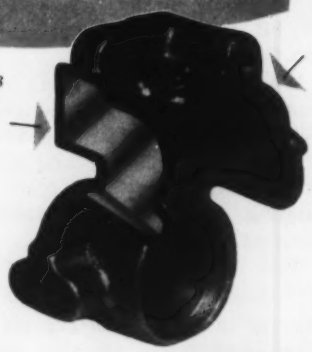
From 6 to 15 four-color slides are used to describe the units, the number depending upon their complexity.

Information on the program or the slide-lecture on any component may be had by writing to Marion Burton, Advertising Manager, Denison Engineering Co., 1236 Dublin Rd., Columbus, Ohio.



FIXTURE AUTOMATICALLY TILTS, CLAMPS PARTS for GENERATING TYPE BROACHING

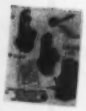
Speeds production of parking brake brackets designed and built the American *way*



Two parallel surfaces on each of two parts are straddle broached in one pass on this American SB-42-10 single ram broaching machine. Over 350 of these intricate parking brake brackets are completed every hour.

For the answer to your broaching problem send a part-print or sample and hourly requirements to American. No obligation. Address Dept. B.

For more information on the American SB-42-10 and other American machines, write for Circular #300.



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A DIVISION OF SUNDSTRAND MACHINE TOOL CO.
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YALE Hand and Electric Hoists beat the bottlenecks that hinder material flow. These dependable "tools"—in capacities from ⅛ to 40 tons—can speed receiving, production and shipping. What's more, they drastically cut handling costs, probably the one remaining phase of your operation in which substantial savings are still possible.

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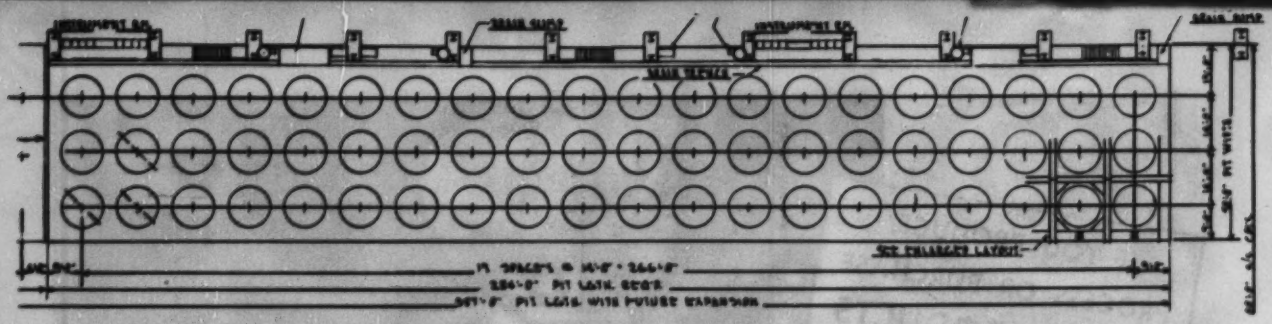


Latest major annealing job to be let is this huge 60 base installation. It went Lee Wilson Single-Stack. It will require 24 furnaces capable of annealing a charge of 60 x 162 inches.

RECENT LARGE INSTALLATIONS INDICATE SINGLE STACK ANNEALING HAS COME OF AGE

In the last two years Single Stack annealing has grown up. The proof — the largest new furnace orders during this period have been predominantly Single Stack.

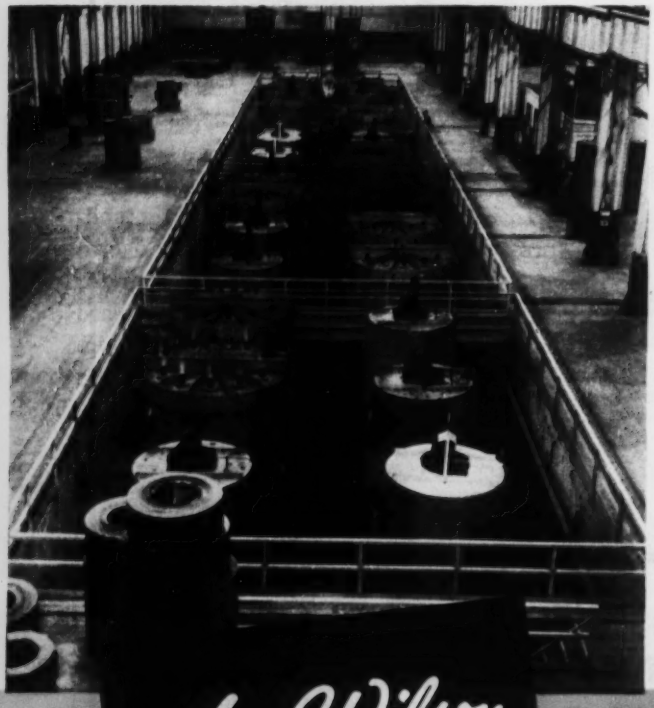
The reasons are many. Single Stack furnaces give producers tremendous flexibility in their annealing operation. The operation is based on single units — not multiples. Thus, when one base is loaded it can be set to work. No waiting. And, by the discriminate grouping of similar sized coils on individual bases, annealing cycles can be adjusted to charge requirements. In many instances base operating time can be shortened and the base freed to receive another charge.

Single Stack furnaces heat up faster and, because the heating tubes are equidistant from all points of the charge, Single Stack furnaces apply a more uniform heat. This means much closer control is possible.

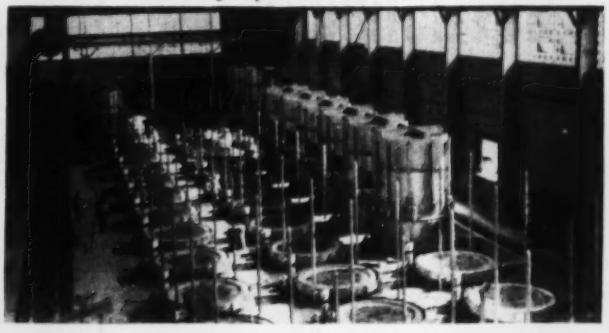
Lee Wilson developed the radiant tube method of annealing, has perfected the Single Stack system and has brought it into prominence through such innovations as the highly efficient "O" type heating tube and the portable base which eliminates the need for expensive basements and understructures.

In fact, Lee Wilson is the largest designer and builder of modern Single Stack annealing equipment, so when next you're talking annealing make sure you have all the facts. Contact Lee Wilson Engineering and make arrangements to have a Single Stack expert at your office at your convenience. There are brochures and data sheets available upon request.

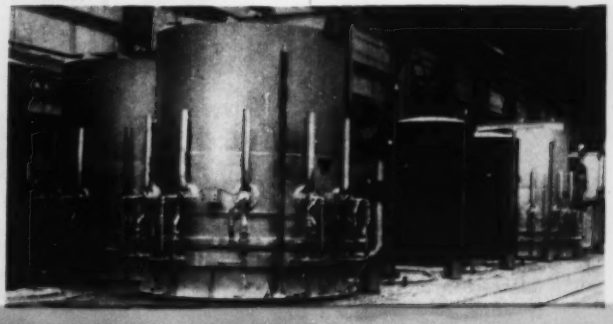
One of the first complete installations of the Lee Wilson Single-Stack Annealing System, this group of 12 furnaces and 30 bases furnished Wilson engineers with real sales ammunition.



In the process of completion is this large Midwestern installation of Lee Wilson Single-Stack equipment. It is composed of 12 furnaces and 36 bases. It will take charges up to 72 x 156 inches.



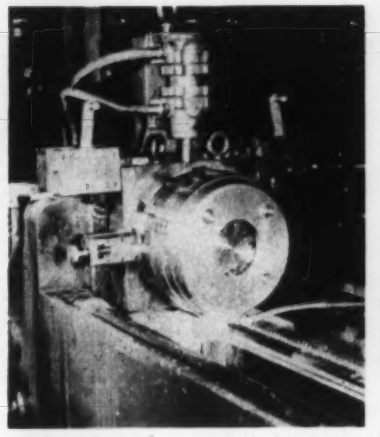
Efficiency of the Single-Stack was proved at this installation in a Southern plant. Here five furnaces and 16 bases doubled production of annealing area.



Lee Wilson

ENGINEERING COMPANY, Inc.

20005 WEST LAKE ROAD
CLEVELAND 16, OHIO



Lubricant In Disc Making

Three copper aircraft brake plates are broached at one time on this 15-ton, 72-inch-stroke Colonial horizontal broaching machine. A coolant-lubricant made by Shear-Speed Chemical Products, division of Michigan Tool Co., is used to eliminate distortion and index errors resulting from heat generated in removing large amounts of metal. Parts produced with the oil are found free from burrs and scores

Grinding Costs Cut

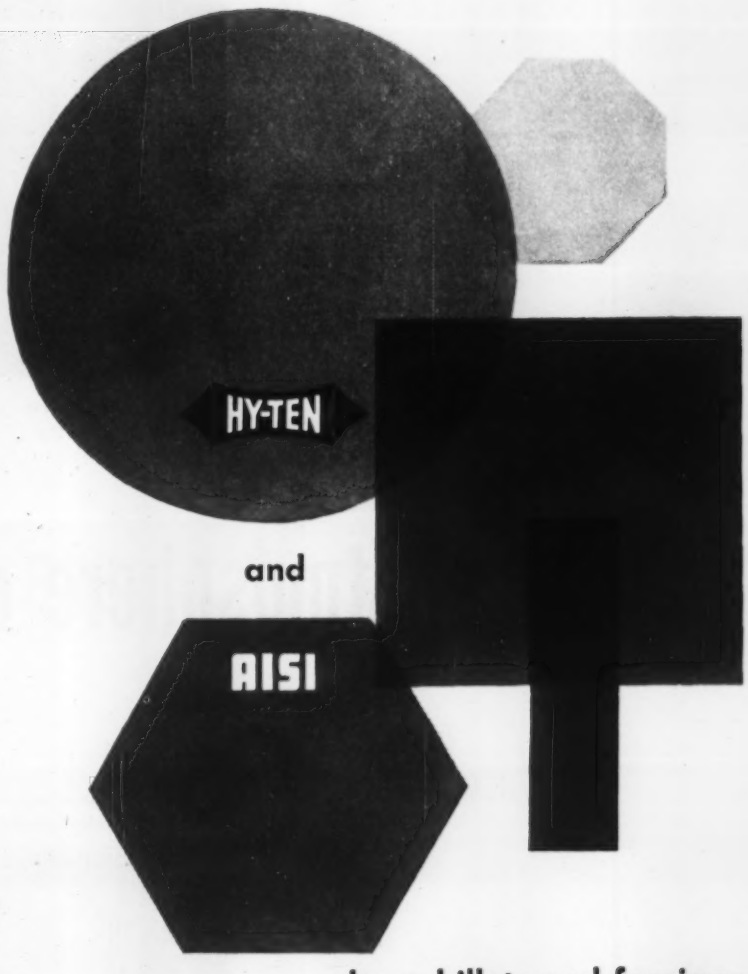
COMPLETE TOOL CHANGE on connecting-rod crank and pin hole roughing and finishing operations has resulted in a 30-per-cent increase in hourly part production at Caterpillar Tractor Co., Peoria, Ill.

New tooling on 4-spindle W. F. & John Barnes boring machines with Wesson boring heads and Wessonmetal solid carbide blades, has increased production to 280 pieces per eight hour shift. Special radial and axial rake angles have resulted in a 40-per-cent reduction in grinding time.

Rate of Cut—Feed has been stepped up from 3 to 7¼ in. per minute. This increased feed produces 48 per cent more pieces on one machine than was previously possible with boring bars on two machines.

With the boring bars, surface speed was held to 310 sfm on the crank end and 260 sfm on the pin end. It's now increased to 360 on the crank end and 320 on the pin end.

Problem—Principle obstacle in attaining this production was the elimination of chatter to give a



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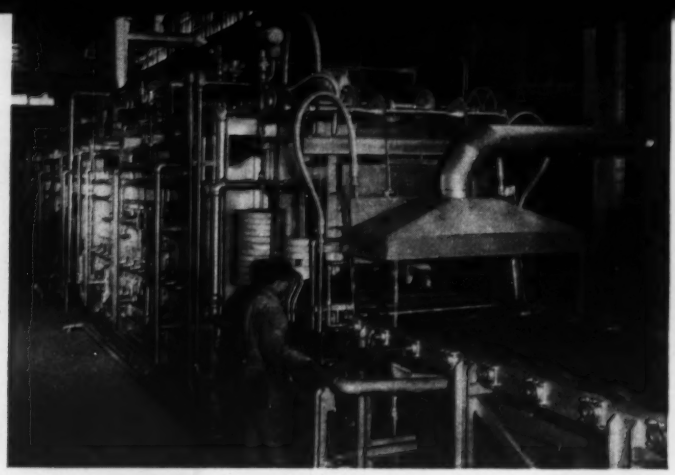
continuous processing

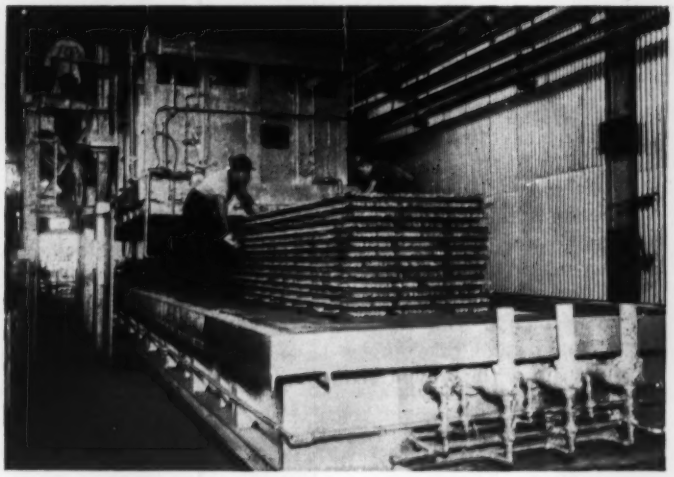


'Surface' roller hearth furnace for continuous carbon restoration-annealing of bars and coils.

'Surface' atmosphere equipment

'Surface' lift cover car bottom furnace used for batch carbon restoration-annealing of bar stock.

batch processing



Here are a couple of graphic reminders that Surface Combustion atmosphere equipment helps meet today's demands for top quality steel.

These cases repeat a familiar story in the steel industry: a steel processor wants to improve the metallurgical qualities of his stock—'Surface' equipment meets, and frequently exceeds, his specifications.

In your current program for improving the marketability of your products, look to 'Surface' to provide the right atmosphere for easier sales.

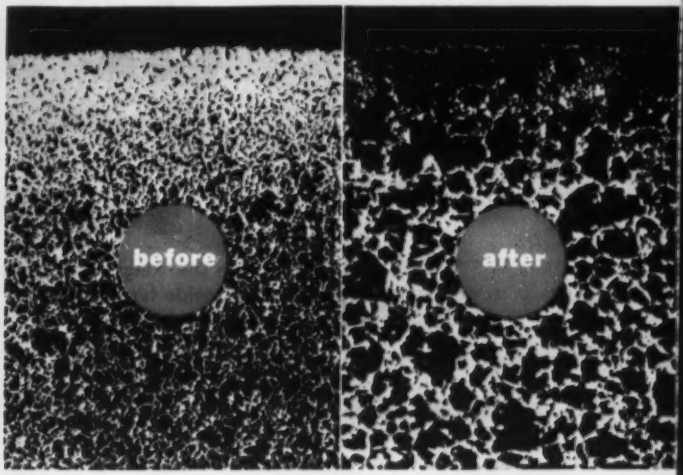
'Surface' atmosphere generators for this installation. RX unit in the foreground, NX unit in the background.

Before and after photomicrographs, Carbon steel AISI C1050. The results: carbon restored to the decarburized skin; steel which reduces the customer's machining costs, eliminates rejects.

makes steel easier to sell

'Surface' atmosphere generators next to the furnace. NX generators and coolers in the foreground, RX generator and dew point recorder in the background.

Before and after photomicrographs, C-1045, 1 1/16" round, coarse grain, 75x, 4% Nital etch. The results: carbon restored to the decarburized skin; steel that sells and opens new markets for the processor.



Surface
STEEL MILL FURNACES

SURFACE COMBUSTION CORPORATION · TOLEDO 1, OHIO

good finish with a high feed rate. The relatively soft steel of the workpiece made it difficult to produce the desired finish.

Success on this operation is attributed in part to special blade angles. Parallel to the axis, they have a tendency to pilot on the OD. Axial negative rake, 10 degrees, acts as a chip breaker.

New Pallet Specs

Revised Minimum Standard Specification for Warehouse, Permanent or Returnable Pallets has been proposed by National Wooden Pallet Manufacturers Association, Washington.

The proposal represents some departures from the original NWPMA specs issued in 1949, plus a general upgrading of minimums.

It establishes two industry grades of pallets, sets up a numerical system for pallet type designation and places new limitations on fasteners, lumber requirements and manufacturing practices. It affects only general purpose units for use in warehousing and shipping.

The standard is intended for use as a minimum for pallet purchasers. Copies of the revised specifications are available to all users (without charge) upon request to the association.

Strain-Gage Balancing

HIGH STANDARDS of accuracy and sensitivity in the static balancing of rotating parts such as cooling fans, helicopter rotors, and other rotors have been established by Dean & Benson Research Inc.

Achievement is the result of the newly developed vertical balancing rod on which SR-4 resistance wire strain gages are bonded. This rod supports rotors to be balanced. Unbalance and its location are detected by banding strains in the rod. The measuring instrument for the balancer was developed by Ruge-deForest Inc., affiliate of Baldwin-Lima-Hamilton Corp., Philadelphia.

Above and Beyond — The high sensitivity of the balancer has been demonstrated in many tests including a 40-ft rotor for a Kaman helicopter. The blades were balanced to 4 inch-ounces although specifications required balance only to 8 inch-pounds.

Time for making tests of this accuracy was reduced substantially also. In one instance a 2000-pound propeller was balanced in 15 to 20 minutes in contrast to 3 to 4 hours with the previously used method.

Another feature of the SR-4 strain gage balancer is its ability to correct chordwise balance of helicopter blades (the balance of weight across the width of the blades). Other means of correction have required as much as two days.

Set in Pairs—The balancing unit consists of a vertically supported rod on which eight special Baldwin SR-4 strain gages are bonded in pairs, 90 degrees apart. Changes in the electrical resistance of these gages under stress are measured by electronic amplifier and bridge circuits contained in a small indicator cabinet.

Imperceptible deflections caused by unbalance can be read directly in inch-ounces on the meter dial. Independent readings 90 degrees apart pinpoint the angular location of unbalanced weight.

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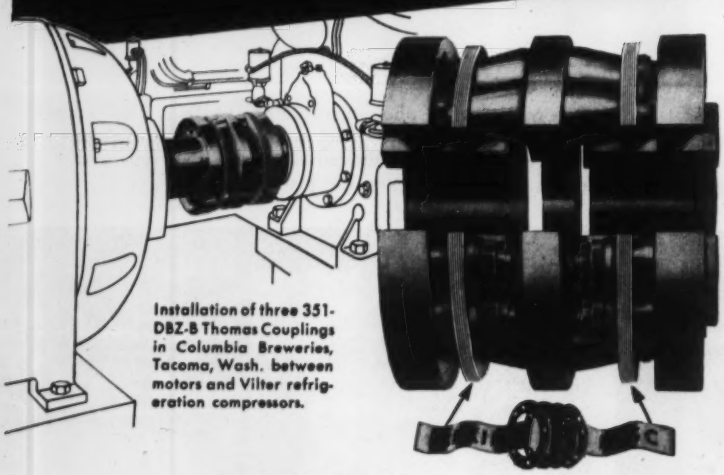
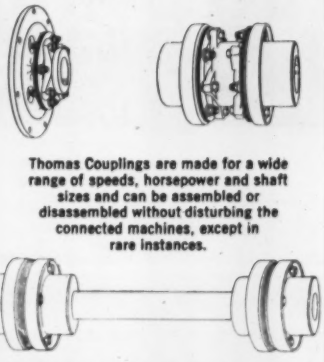
for more years of better service!



Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES	
FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.

Write for our new Engineering Catalog No. 51A

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Here's a new "trick of the trade" you can use to get valuable new business. It's a brand new way to close more sales—a way to get *your* quotation accepted—and a way to beat out your competition!

When your customers specify other materials give them an *alternate* quotation *based on aluminum*. The figures will astonish you, for aluminum gives you three times as many pieces per pound!

Up Goes Production. Down Go Your Costs. Strong, lightweight aluminum offers the very lowest unit costs for material, machining, handling and shipping.

SCREW MACHINE ALLOYS

11S-T3—Free machining. Fine finishes at high speed. Free cutting, fine chips, good strength. Excellent for screw machine work. Longer tool life but slightly less strength than 17S-T4. Good formability of machined parts.

17S-T4—Excellent finishes. Fine for general purpose machining. Good corrosion resistance and strength.

Greater speeds and feeds are possible with aluminum alloys. They are easier on tools, but sometimes minor tool modifications are required.

SPECIAL MACHINING ALLOYS

24S-T4—For simple machine work. Chips long and curled. Stronger than preceding alloys. Smooth finishes.

61S-T6—Good corrosion resistance, weldability, strength. Lower machinability. Best formability and suited to electro-chemical finishes.

2S and 52S—Higher purity aluminum alloys available for special applications. Have good formability.

Finishing is not required because aluminum is rust free. When desired, it takes all standard finishes in addition to many beautiful, anodized colors.

Find Out About this New Way to Get Your Quotations Accepted. Call the Reynolds Office or Distributor listed under "Aluminum" in your classified telephone directory.

Write for FREE Book. Write on business letterhead for your copy of the 124 page handbook, "Machining Aluminum Alloys". Reynolds Metals Company, 2520 South Third St., Louisville 1, Kentucky.

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MODERN DESIGN HAS ALUMINUM IN MIND

Disposable Insert Tool

INITIAL GRINDING of a radius tool was so expensive and maintaining the required form in regrinding so difficult, plant engineers of a large earth moving equipment manufacturing company designed their own grooving tool.

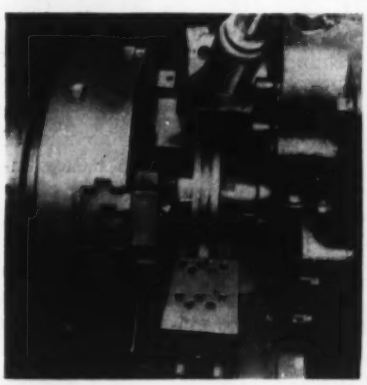
Old Tool—Formerly, they used a conventional brazed carbide forming tool to plunge groove a 5/16-inch radius ½ inch deep into the face of a 10-inch diameter SAE 1040 steel pulley on their Potter and Johnston lathe.

Their grooving tool utilized a standard ⅝-inch diameter indexable kendex insert, style RD-10 of grade K2S Kennametal sintered tungsten carbide. With this screwed-on indexable insert tool, 100 to 125 pulleys are now being grooved after which the insert is rotated 180 degrees to provide an entirely new cutting edge.

Thus, 200 to 250 pulleys are grooved, after which the insert is discarded and replaced with a new one to eliminate all regrinding. Depth of cut on this operation is ½ inch and feed is 0.015 inch at 160 surface feet per minute.

Simultaneous Operation — Outside diameter of the pulley is turned prior to the grooving operation. Two Kennamatic tungsten carbide triangular insert tools are used for straddle facing the sides of the pulley while grooving with the insert tool.

In a subsequent operation a 120-degree included angle is machined tangent to the groove radius.



Plunge grooving a 5/16-inch radius ½ inch deep into face of 10-inch diameter, 1040 steel pulley is done at 160 sfm. Indexable carbide insert is thrown away after 200 to 250 parts

Tube Straightener Keeps Up

INEFFICIENT straightening of Incoloy and stainless steel type 309 tubing used for Calrod heating elements was holding back production at Hotpoint Co.

Three heavy duty tube straighteners manufactured by Mackintosh-Hemphill Co. were installed in the tubing department along with a new six-roll rotary straightener. Now 30,000 feet of tubing are straightened on the Model AXY machine in one shift.

Problem Solved — Straightening tube of the units is not easy. Majority of tubing is ¼ inch OD, with 0.018-inch wall. Lengths vary from 10 to 12 feet. However, the unit keeps pace with the department's arc-weld tube making.

The straightener ordinarily works two shifts per day. Adequate production is obtained with variable speed control on the rotary machine set at around 150 fpm, less than one-half the rated speed.

Write today for one or all of Florida's ten new folders which set forth in plain, unvarnished form the basic facts about Florida's opportunities for new industry. These folders have been prepared in convenient individual file-size form for ready reference.

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✓ **LOWER COSTS**	You save on total abrasive cost, labor, maintenance, machine time, handling and storage.

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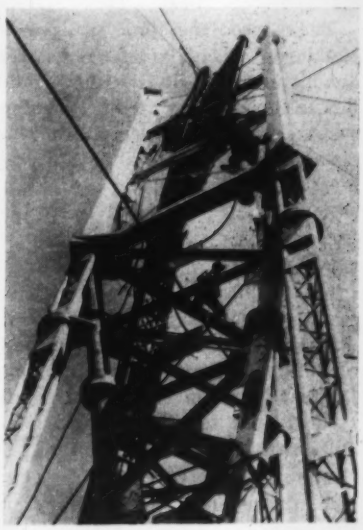
Electrodes in Construction

WELDING plays an important role in heavy construction. Example, at left, is the 1572-foot TV tower built for station KWTV at Oklahoma City, Okla.

The 675 tons of steel making up the detail elements were shop welded and shipped to the site for bolted erection. Welding operations involved attachment of heavy circular flanges to each end of the individual leg sections, plus



TOWER PARTS SHOP-WELDED
. . . *bolt-erected on site*

location of wing plates for bolting the girts and diagonal bracing members.

Iron Powder — Indeco Division, Dresser-Stacey Co., Columbus, O., estimates it used about 11,000 pounds of Lincoln Electric Co.'s iron powder Jetweld electrode in welding flanges, platforms and wing plates manually to the leg sections. Some heavier flanges took as much as 40 pounds of electrode and 40 to 50 passes inside the bore and out.

With the erection method used, two legs and bracing of each section are bolted together on the ground, then hoisted into position by an electric gin pole. Most legs are 30 feet long. The gin pole is a 10-foot boom fitted with an electric winch inside its latticed structure. Once the two legs are in place and the flanges bolted, the remaining leg is hoisted and the bracing bolted to its wing plates.

Here's your guide to NEW SAVINGS with NEW Standardized BOSTON Gear Products — from STOCK

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Sprockets up to 24" pitch dia. — and Bushings to fit shaft sizes from ½" to 3" by 16ths. Also, more sizes available in conventional sprockets.

NEW

BOST-BRONZ BEARING BANK

A sturdy metal kit, with 47 common sizes of Bost-Bronz oil-impregnated bearings, from which 313 standard sizes can be cut with a hacksaw — means you have any bearing you need on *hand* in any emergency. Saves 50% over buying same bearings separately.

20 SHAFT SIZES UP TO 2 3/16"

NEW

PILLOW BLOCKS and Flanged Cartridges in larger sizes

ADDED TO FORMER ½" TO 1¼" RANGE

Now, precision Type ABEC No. 1 Classification Bearings in a stock size range for 27 shaft sizes from ½" to 2 3/16", fully self-aligning.

NEW

20° PRESSURE ANGLE SPUR GEARS in a full range of stock sizes

Off-the-shelf delivery on 20 pitch to 4 pitch with pitch diameters from .6" to 40". Save 20% in weight — space — cost.

NEW PRODUCTS Catalog NP-55

lists full specifications of these new Boston Gear products and many others in 196 pages. Get your copy . . . use it with your BOSTON Gear General Catalog No. 55 . . . for up-to-the-minute information on the products that make BOSTON Gear first choice of cost-wise buyers.

NEW

3-PIECE JAW COUPLING with BOST-BRONZ insert

BOST-BRONZ oil-impregnated Bearing cushions torsional load, resists wear from any rubbing friction . . . 17 stock sizes, with hole diameters from 3/16" to 1½".

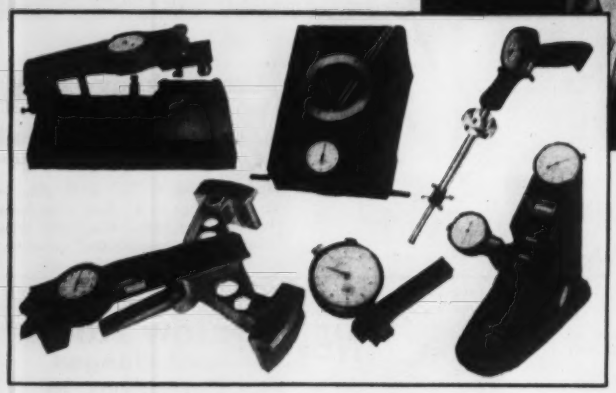
Get your copy from your nearby

BOSTON Gear®

DISTRIBUTOR

Look under "Gears" in the Yellow Classified Section of your Telephone Directory for the BOSTON Gear Distributor nearest you. Catalog NP-55 also available from Boston Gear Works, 73 Hayward St., Quincy 71, Mass.

How to Avoid His Costly Mistake!



He bought a special gage for a job a Federal Modified Gage could do!

He's not alone! There are too many other gage buyers who mistake something *new* for something *better* . . . and get involved in needless expense and grief.

Who's to blame? When gage buyers follow fads, instead of shopping the field first, it's usually because they haven't the time to investigate. They haven't time, for example, to evaluate each of the 30,000 Federal gage designs in terms of their particular problem. So, they believe a new job calls for a new gage.

Even the largest firms are victims. One of the mass-production leaders bought the latest thing in fancy gages only to learn their accuracy could not be maintained. Now, Federal gages are back on that job.

It's easy to be sure! Call in your nearby Federal sales engineer. He is backed by thousands of Federal gage designs and can give unbiased advice about air, dial indicating, electric or electronic gages . . . because Federal makes them all. If your dimensional control problem calls for a new gage design, he can quote the costs, for most Federal *catalog or modified* gages were *once* customers' specials. Why not talk with Federal soon?

Our new booklet "A Management Blind Spot" reveals unappreciated shop situations and tells how they can be corrected. For your copy, write FEDERAL PRODUCTS CORPORATION, 4219 EDDY ST., PROVIDENCE 1, R. I.

Ask **FEDERAL**

FOR ANYTHING IN MODERN GAGES...

Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Automatically Controlling Dimensions on Machines.

Supplier Metallurgists

STEEL SUPPLIER metallurgists can be the customers' best friends. Take the case of the Portland Iron Works, Portland, Ore.

The company makes band mill wheels, ranging from 6 to 11 ft in diameter and weighing as much as 3¼ tons, by casting a rim around spokes. The hub is cast after the rim cools for two or three days and assumes its natural shape.

Exact time for casting the hub is determined by the residual temperature of rim and spokes. In

RIM CASTED AROUND SPOKES
. . . hub casted when rim cools

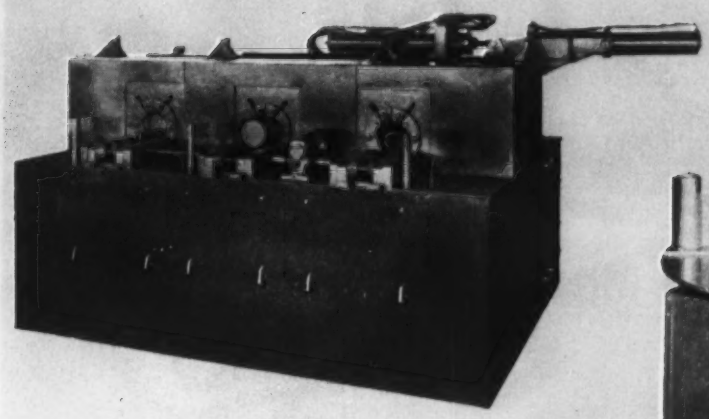
cooling, the hub contracts, pulling on all spokes equally, and places them under proper tension.

Role of the Rep—When the company ran into trouble in properly casting the ribs and hubs, they called in representatives of Bethlehem Pacific Coast Steel Corp. to analyze the operation. Their recommendation called for substituting C-1008, a low carbon steel, for the spokes. The substitution worked out according to recommendations.

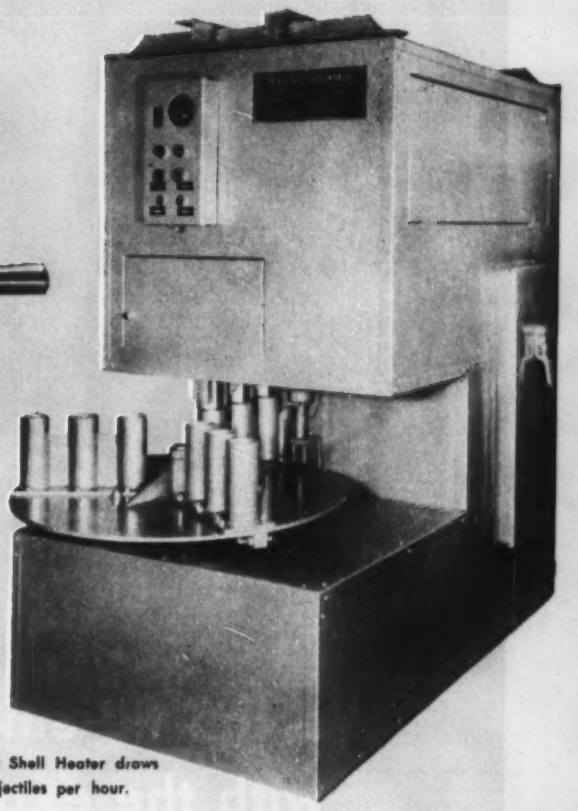
After further examination of the cost angle, metallurgists followed with a second suggestion—that the Iron Works turn the job of making spokes over to Bethlehem Pacific's Seattle bolt and nut plant. Now, ¼-inch rounds are delivered to the Portland plant, cut to length and upset at both ends. The fabricator merely tins the ends, and spokes are ready for casting into wheels.

Why, Where, How and Wherefores...

of low-frequency (60-cycle) induction heat



3-coil Magnethermic brass billet heater is rated at 8,000 pounds per hour.



This Magnethermic Shell Heater draws 200 (75 mm) projectiles per hour.

HERE'S THE WHY

Rapid and penetrating heat ... preheating an 8″ dia. copper or brass billet in less than two minutes ... on a production basis. Temperature of each billet is measured. Cold or over heated billets cannot reach the press. No need to schedule billets ahead of time. A Magnethermic Heater is always ready to go without warm-up time. Press the button and you have a hot billet immediately.

HERE'S THE HOW

You require a heater with either single, double or three coils, depending upon your production. A Magnethermic engineer will come to your plant and outline what you need and answer any of your questions. Setting up for low-frequency (60-cycle) heating is not complicated. Installation can be made in a matter of hours and floor space is at least a third less than for conventional furnaces.

HERE'S THE WHERE

Use this penetrating heat for preheating, prior to hot working such as forging or extruding. You can heat rounds, squares, hexes ... in lengths from slugs up to long bars. The diameter range: Steel (carbon or stainless) above 4″ dia.; Brass above 2″ dia.; Aluminum above 1″ dia.; Titanium above 4″ dia.

For example, this method has proved successful for annealing steel parts or preheating gears prior to shrinking or hardening.

HERE'S THE WHEREFORE

The Magnethermic heats scale-free. An added incentive—this heat can be accomplished inexpensively in an inert atmosphere. Magnethermic has pioneered the use of low-frequency (60-cycle) induction heating and has installed most of the heaters in use. Much research on low-frequency (60-cycle) induction heating has been done in Magnethermic's research laboratories. Use this experience to help you decide which is the best heating method for your production.

60-CYCLE

MAGNETHERMIC

corporation

3990 SIMON R... YOUNGSTOWN 7, OHIO

INDUCTION HEATING

Your inquiry ...

If you want information on a Magnethermic Heater for your plant, let us know what size billet you intend to heat; for what use; and desired production rate. Your inquiry will receive prompt attention.

WHY IT PAYS TO BUY SHEETS and STRIP FROM US

We can fill emergency requirements with the exact quality you need

You needn't worry when you find you're running out of steel sheet or strip and are unable to complete a production run. You can depend on U. S. Steel Supply to rush the needed steel to your plant or shop immediately. And because of the complete stocks in all our warehouses, you can be sure you'll get steel of exactly the same quality and specification you were using. So you don't have to lose costly production time when you need extra steel.

All the sheet and strip we sell bear the famous USS trade-mark—your guide to quality steel. Call us for: hot rolled, cold rolled, vitrenamel, galvanized, galvannealed, paint bond, corrugated, long terne sheets, and hot rolled and cold rolled strip steel.

TRIPLE SECURITY

What you want
When you want it
At the **right price**

U. S. STEEL SUPPLY

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General Office
208 So. La Salle St., Chicago, Ill.

USS

Warehouses and Sales Offices Coast to Coast

USS STEEL — UNITED STATES STEEL

UNITED STATES STEEL

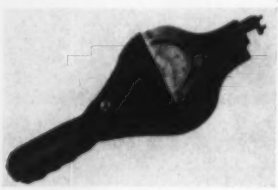
NEW PRODUCTS and equipment

Reply card on page 171 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue

Pyrometer

. . . you need no extra light

An illuminated dial has been incorporated as an extra in Gordon's line of Xactemp hand pyrometers. It permits reading in poorly-lighted areas without flashlight or auxiliary lighting.



Two easily replaced batteries are contained in the handle of the instrument. A conveniently located push-button switch lights the bulb under the shield. Claud S. Gordon Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 1

Welding Electrode

. . . no high preheat needed

Bronze-Arc Mn for welding manganese bronze has been added to the Alloy Rods line. It is used for fabrication and repair of manganese bronze without the need of high preheating temperatures. Physical properties of the weld deposits are equal to or better than plate material of the same type and with basically the same chemical composition.

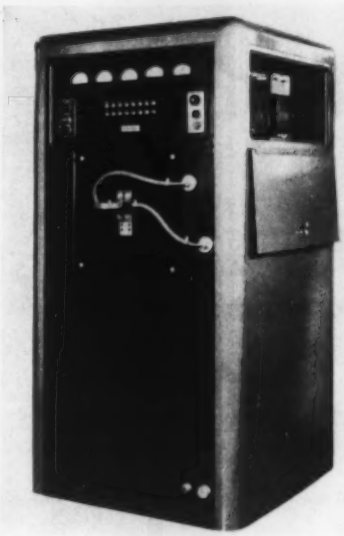
It is being used to weld such manganese bronze castings as gears and pump housings, impellers, mixer beaters, gears, worms and valves. Welding fabrications from plate are also practical. Alloy Rods Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 2

Motor Generator

. . . two sawing heads

This unit is designed for forging, hardening, brazing or annealing where deep penetration of heating is desired.



Output transformer can be installed or removed through either front or rear of station. A system of checklites maintains constant control on operating conditions of the motor generator and work stations. Unit is housed in steel cabinet 39 x 39 x 76 inches and weighs about 2000 pounds. Motor generators sets have frequency cycles of 960, 3000 or 9600 and power input ranging from 50 KW to 1250 KW. Lindberg Engineering Co.

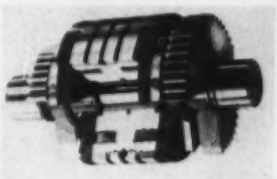
FOR MORE DATA CIRCLE REPLY CARD NO. 3

Electric Clutch

. . . rapid speed change

A clutch that fits requirements of transmission employing constant mesh gearing, provides constant horsepower output, quiet operation and rapid speed change.

Safe, positive operation is assured because the clutch is controlled by a 24 volt dc circuit, and no field adjustment of the torque



value of the clutch can be made. Maintenance is reduced to a minimum since clutch is self-compensating and no adjustment for wear of clutch plates is required. I-T-E Circuit Breaker Co.

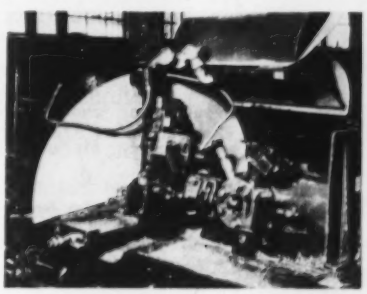
FOR MORE DATA CIRCLE REPLY CARD NO. 4

Marking Tool

. . . marks part, cuts off

Positive marking on parts is provided by a Method Model 700 automatic marker which marks the part and cuts it off.

Characters are stamped on the valve bodies first as the cut-off



tool advances. Since the roll die is only a segment of a circle, it is carried clear of the part after marking and the cut-off tool continues to advance until the job is

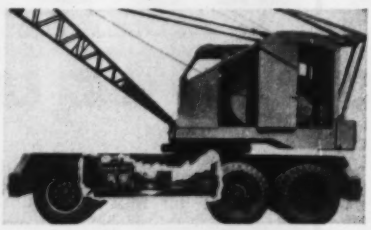
completed. The new tool requires 10 minutes of set-up time, adding an additional slide to the machine. New Method Steel Stamps Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 5

Crane Carrier

. . . is self-propelled

The big feature of the Cook Bros. crane carrier, CW-312, is that it is self-propelled. The power plant consists of a 115-hp gasoline industrial engine, torque converter, 3-speed and reverse transmission, auxiliary transmission



with emergency and/or parking brake, which is assembled on a sub-frame.

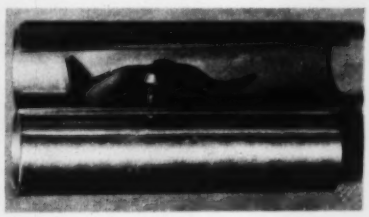
Operation of the carrier is from the operator's position in the crane cab and features hydraulic steering and air brakes, yet there are no air or hydraulic lines running from carrier to crane. Controls are operated by mechanical linkage. Cook Bros. Equipment Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 6

Stud Welding

. . . clip held firmly

Nelson Stud Welding Division's special headed stud is first end welded to a tube. Stud is passed through a hole formed in one side of the other tube. The clip, with a slot in one end forming two spring legs, is inserted in the



second tube until spring legs straddle stud. Spring tension holds clip firmly.

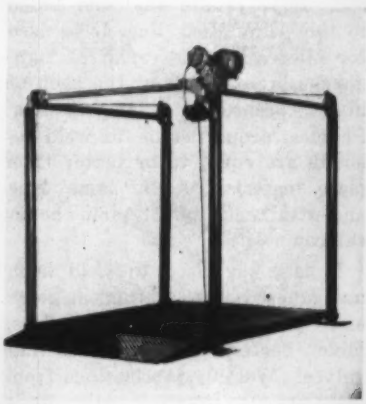
Although primarily intended for fastening two tubular members, the procedure may be used advantageously for securing two flat plates. Gregory Industries Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 7

Electric Loader

. . . electrically motivated

Among the advantages reported by Globe for its Electro-Loader is



the ease with which the lift may be installed. Because no ground

STOP RUST
STOP RUST
STOP RUST

NEW

CLARK

Type DM

MACHINE LIMIT SWITCH

CLARK Type DM Limit Switches have been running on this "life" test rack continually for millions of operations

• designed and built for dependability and longer life -

Our design engineers were given the assignment of developing a new heavy-duty machine limit switch to meet the exacting needs of modern industry. Primary requisites were dependability, accuracy, durability and versatility. They created a design that is rugged, simple and 100% functional. They selected materials for the working components that hold up indefinitely under the most severe punishment. They employed sound, mechanical principles to provide positive, accurate, trouble-free operation, and added features to make the switch as nearly "fail-safe" as possible.

Pilot models were subjected to severe breakdown tests, and changes made as indicated. When our high standards for performance and durability were finally met, the initial production run was made. The first production units were placed on the test rack illustrated, and have been operating continuously ever since.

THE CLARK CONTROLLER CO.

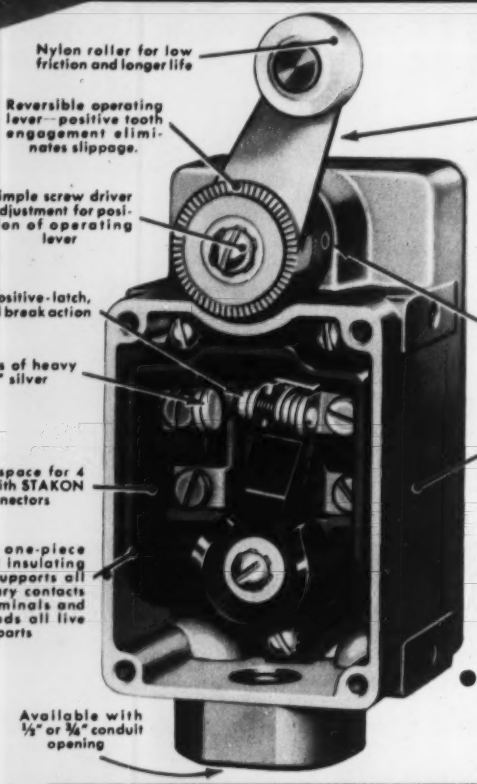
ENGINEERED ELECTRICAL CONTROL • 1146 EAST 152ND STREET, CLEVELAND 10, OHIO

See other side for further details

CLARK Type DM LIMIT SWITCH

built for RUGGED SERVICE

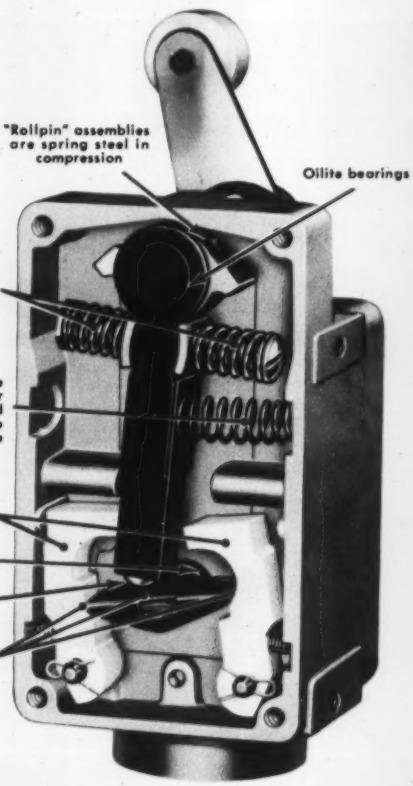
VERSATILITY • LONG LIFE • ACCURACY


Nylon roller for low friction and longer life
Reversible operating lever—positive tooth engagement eliminates slippage.
Simple screw driver adjustment for position of operating lever
Quick, positive-latch, make and break action
Contacts of heavy "fine" silver
Ample space for 4 wires with STAKON connectors
Heavy one-piece molded insulating block supports all stationary contacts and terminals and surrounds all live parts
Available with ½" or ¾" conduit opening
"Rollpin" assemblies are spring steel in compression
NEMA Type 5 dust-tight, oil-tight enclosure
Areas subjected to arc deterioration protected with glass-melamine plates
All springs are in compression
Electrical and mechanical sides of switch are completely isolated

OPERATING LEVERS

8 TYPES AVAILABLE FROM STOCK

CLARK Type DM LIMIT SWITCHES are simply built, with a minimum number of parts. They are designed for one purpose: to provide dependable, accurate, trouble-free operation for a long life. All latch and trip-bearing surfaces are nylon to steel for minimum wear. All springs are in compression for greatest safety—they cannot be overloaded.

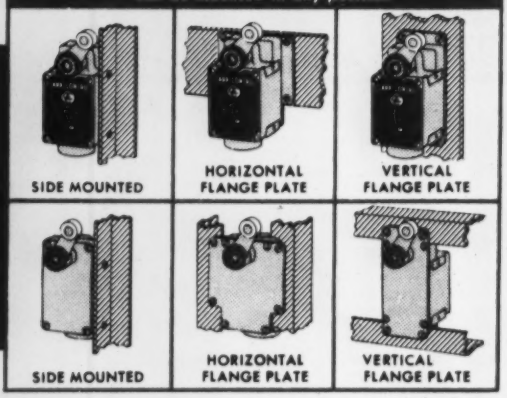

"Rollpin" assemblies are spring steel in compression
Oilite bearings
Double concentric over-travel springs in compression for "fail-safe" operation
Return spring can be used on either side or removed for maintained contact—requires no tools to remove, change or replace
Nylon Latches with exceptional wearing qualities
Oilite bearings
Nylon spring-loaded contact operator
All latch and trip bearing surfaces are nylon to steel

REGULAR AND REVERSE LEVER TYPES

— can be mounted in any position

REGULAR MOUNTING TYPES

REVERSE LEVER MOUNTING TYPES



Six styles of back covers or mounting plates are available for an infinite variety of mounting arrangements.

Insist on CLARK Type DM Limit Switches for more dependable, longer life operation on all your new machines and for replacement of unreliable or worn out switches on equipment now in use.

THE CLARK CONTROLLER COMPANY
1146 EAST 152nd STREET • CLEVELAND 10, OHIO

Please send me Bulletin 102 DM describing the new CLARK Type DM Limit Switch.

NAME_____

TYPE OF BUSINESS_____

COMPANY_____

ADDRESS_____

CITY AND STATE_____

Send for 4-page descriptive bulletin giving full specifications and ratings. Use this coupon.

NEW COST-SAVING PROCESS FOR FOUNDRIES

The Airco Carbide Injection Process in use at the American Brake Shoe Company, Mahwah, N. J.

Carbide injection process developed by AIRCO® cuts ductile iron alloy costs up to 50 percent

permits melting in acid cupolas

Visit Airco and check up on carbide injection equipment in Booth 328 at the 1954 Foundry Show, Cleveland, May 8-14.

Many foundries that have limited their production to gray iron will soon enter the ductile iron field, thanks to a new Airco development. Desulfurization of molten iron by injecting calcium carbide can reduce sulfur content to such levels that ductile iron can be melted in ordinary acid cupolas. At the same time, this sulfur content — as low as 0.01 percent — makes it possible to cut the amount of expensive alloy elements drastically with no sacrifice of mechanical properties. Foundries already using Airco carbide injection report savings of up to 50 percent on these alloy costs alone!

The injection equipment itself is simple and inexpensive. It consists of a hopper and an injection tube through which the powdered carbide is injected into the molten iron by a stream of nitrogen. The operating expenses are the cost of the gas and the carbide, trivial in comparison to the savings they make possible.

Calcium carbide injection is a fruitful result of Airco Technical Service's constant effort to find new profitable techniques for customers. If you have a welding, cutting or metallurgical problem, why not let Airco help you develop the most practical approach to it? It can pay big dividends.

AIR REDUCTION

60 East 42nd Street • New York 17, N. Y.

at the frontiers of progress you'll find...

Divisions of Air Reduction Company, Incorporated, with offices and dealers in most principal cities

Air Reduction Sales Company
Air Reduction Pacific Company

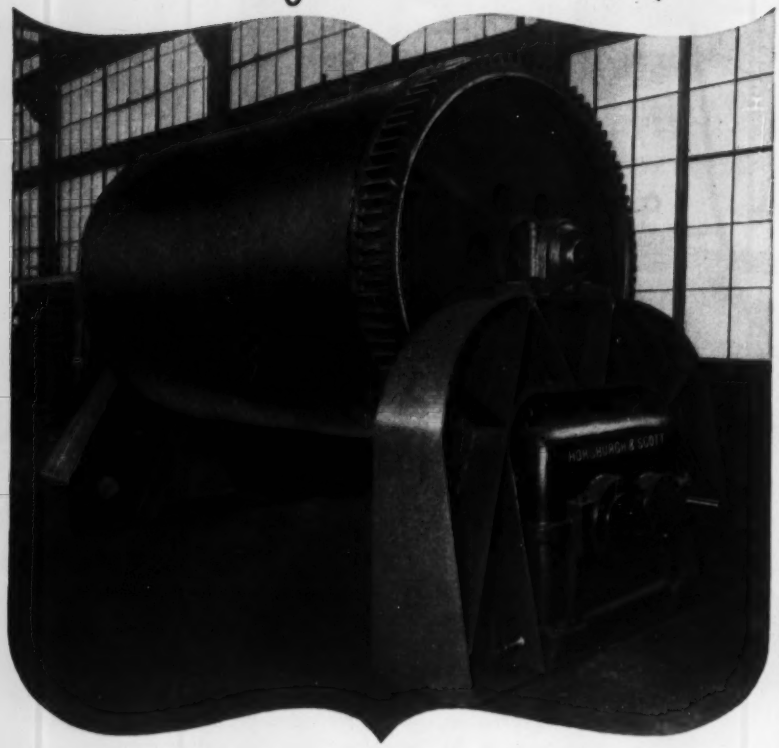
Represented Internationally by
Airco Company International

Foreign Subsidiaries: Air Reduction Canada Limited, Cuban Air Products Corporation

H & S SPEED REDUCERS

save maintenance and space with

Greater safety



• Since 1940 the Horsburgh & Scott Herringbone Speed Reducer illustrated above...driving an Epworth Manufacturing Company Ball Mill in a large paint manufacturing plant... has been in operation with *no* repairs necessary. The service is severe with heavy starting load and the machine operates continuously for periods of 24 to 72 hours. As compared with the old drives the results are: greatly reduced maintenance and space... greater safety is also an important feature. H & S Speed Reducers offer many savings and advantages throughout the range of industry...it will pay you to investigate.

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVE. • CLEVELAND 14, OHIO, U.S.A.

Send note on Company Letterhead for Speed Reducer Catalog 46

NEW PRODUCTS and equipment

excavation or special foundation is necessary, it may be placed on upper floors, temporary locations, etc.

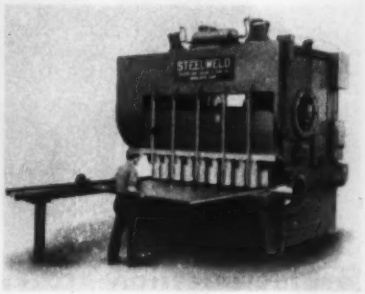
Lifting power is supplied by an electric motor operating a simple cable mechanism which raises the checkered steel plate platform to above-floor height of 5 feet 10⅜ inches, or levels accurately at any intermediate point. Globe Hoist Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 8

Plate Shear

. . . for production shearing

Model No. 24G-8 is designed for production shearing of steel plate in size up to 8 feet long by 1½ inches thick. Shear is ruggedly constructed with end housings, crown and bed welded into a solid one-piece unit. End housings have heavy, deep throat forgings that add to frame strength and increase shearing possibilities.



Machine operates on pivoted-blade principle. Electric foot switch is used for operation of shear. Clutch and brake unit are air-operated. Operating speed is 22 strokes per minute. Cleveland Crane & Engineering Co.

FOR MORE DATA CIRCLE REPLY CARD NO 9

Positioning Table

. . . with power tilting

Power tilting has been incorporated into the design of Rotab universal positioning tables by the Cone-Drive Gears Division. Cone-Drive shaft mounted speed reducers on the end of the tilting shaft have been used.

Compactness of the shaft mounted speed reducer, possible because of size advantages inherent in double enveloping worm gear design,

Vaughn®

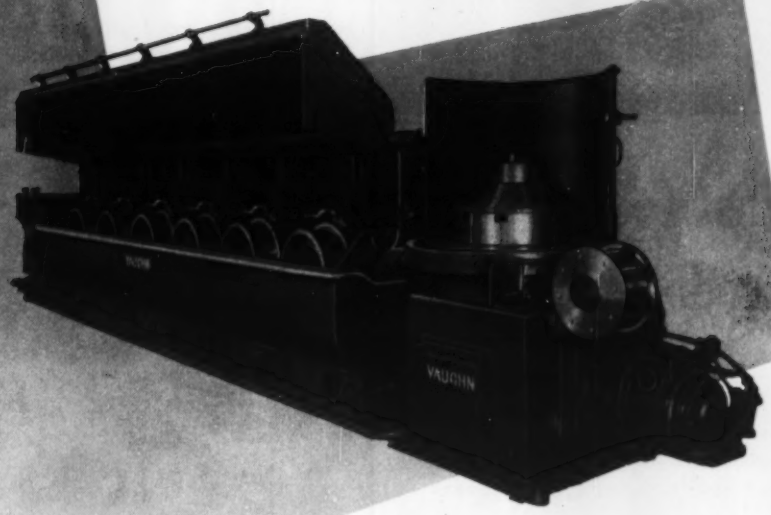
THE ONLY MANUFACTURER
BUILDING A COMPLETE LINE OF

Tandem Machines

FOR DRAWING NON-FERROUS WIRE
(ALUMINUM, COPPER, ALLOY)

Ringblox®

(Circular Tandem)
FOR INTERMEDIATE
AND FINE WIRE



Straight Tandem Types

FOR COARSE WIRE

"Quick on the Draw!"

Vaughn Tandem Machines provide modern speed and versatility in drawing non-ferrous wire, combined with the engineered dependability that reflects Vaughn's many years of specialization in this field. Details? Gladly—at your convenience.

THE VAUGHN MACHINERY CO.
CUYAHOGA FALLS, OHIO, U. S. A.
COMPLETE COLD DRAWING EQUIPMENT—Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

This battery just fell off the shipping dock!

The EDISON Nickel-Iron-Alkaline Storage Battery, shown being watered here, was undamaged while in a fork truck that fell 4½ feet off the shipping dock.

This extreme example presents one of the vital advantages you can enjoy with EDISON. The EDISON cells are steel cells, with plates and poles of steel—assembled with modern machine tool precision. Such construction means unequalled battery strength for rugged daily battery service and extremely long service life. For thousands of EDISON users, this has meant top performance for *more than twice the life* of conventional batteries . . . and the lowest over-all battery costs possible.

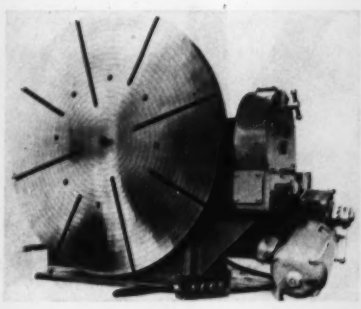
Learn more of EDISON'S superior advantages for profitable industrial truck operations. Request a visit from the EDISON Field Engineer nearest you. Write Edison Storage Battery Division, Thomas A. Edison, Incorporated, West Orange, N.J.

Most dependable power... lowest over-all cost you get both with an EDISON

EDISON
Nickel • Iron • Alkaline
STORAGE BATTERIES

EDISON ALSO MAKES THE FAMOUS "V.P." VOICEWRITER AND THE TELEVOICE SYSTEM

permits the table to be motorized without any appreciable increase in bulk. The entire unit can be



placed on any flat surface and used for checking or a variety of machining operations. Michigan Tool Co.

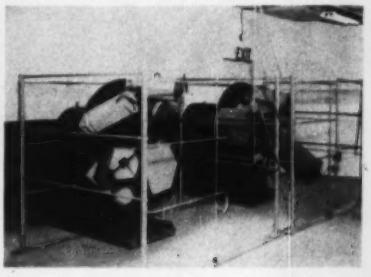
FOR MORE DATA CIRCLE REPLY CARD NO. 10

Tumble Finishing

. . . multi-barrel unit

BMT SlideHoning equipment is a multi-barrel unit with a 48-inch revolving disc on which can be mounted as many as 25 barrels with a rotating speed from 11 to 28 rpm. Different sizes and shapes of barrels are available, plus a range of mountings.

A safety cage encloses the equipment and is so arranged that the



gate must be closed before the machine will start. Two types of barrels are provided: A stud-mounted type that bolts directly to the rotating disc; quick-adaptor type that has a safety lever connection permitting instant mounting and removal from the machine. BMT Mfg. Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 11

Heavy Duty Fork Truck

. . . a 20,000-pound machine

A heavy duty pneumatic-tired fork truck, the Clark-Ross Y-200

GEAR RACKS

..any size

..any type

..any material

ILLINOIS GEARS

Reg. U.S. Pat. Off.

Gears for Every Purpose ... one gear or 10,000 or more

ILLINOIS GEAR & MACHINE COMPANY

is a 20,000-pound machine at 24-inch load center. It is hydraulically controlled thoroughout, including lift, tilt, power steering and power braking. All main hydraulic units are in a separate compartment directly accessible through hinged panels.

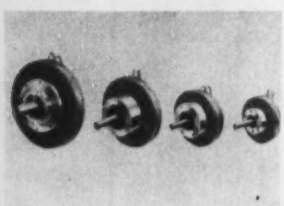
Truck is powered by a Hercules industrial engine of 320 cu in. displacement, rated at 112 hp at 2800 rpm. Transmission provides four speeds forward and reverse, and is equipped with a 14-inch, heavy-duty single-plate clutch. Clark Equipment Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 12

Electric Brakes

. . . with replaceable facing

A line of electric brakes and clutches is intended for use in all types of industrial machines. They will be made in a wide range of sizes, making application possible on machines which have been unable to use electric control.



Brake features a replaceable facing. The clutch operates on the stationary field principle which induces current into a rotating coil. It needs no slip rings or brushes. Both can be controlled by push-button, by the operator or by electric switches, relays, electric eyes, etc. Warner Electric Brake & Clutch Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 13

FREE LITERATURE

Catalogs and Clip Sheets

Reply card on page 171 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue.

Steel Forgings

American Brake Shoe Co.—The AmForge Division offers a 16-page, 2-color brochure on steel forgings. Facilities, quality control and case histories are emphasized.

FOR A FREE COPY CIRCLE REPLY CARD NO. 14

Crawler Tractors

Caterpillar Tractor Co.—Booklet D438 depicts improved methods of crawler tractor manufacturing over the past 50 years. Included is a brief history of track-type tractor manufacture, beginning with the building of first practical model.

FOR A FREE COPY CIRCLE REPLY CARD NO. 15

Distribution Transformer

General Electric Co.—A 24-page publication describes distribution transformers. Design features, advantages of impulse testing, nitrile rubber gaskets, Strenicor terminal clamps, clamp-type H-V connectors, bushing terminals that handle aluminum and copper conductors are covered. GEA-6070 includes cutaways, cross-sections, graphs, diagrams, actual-size photos and 3-color photos.

FOR A FREE COPY CIRCLE REPLY CARD NO. 16

Electric Tube Furnaces

Burrell Corp.—Bulletin 310 describes high temperature electric tube furnaces for laboratories. Two models and 7 furnace sizes are listed. Complete data, including description of models and sizes, catalog numbers, dimensions, specifications, ordering data and prices, are given. Separate charts list heating elements required.

FOR A FREE COPY CIRCLE REPLY CARD NO. 17

Welding, Cutting Equipment

Air Reduction Co. Inc.—Air Reduction Sales Co. Division offers a 52-page catalog describing and illustrating all Air Reduction products regularly used by job shops, maintenance departments and other users of light welding and cutting equipment. The catalog is designed to acquaint customers with the line of products, explaining how each item operates and jobs for which it is best suited. Specifications and stock number information is supplied.

FOR A FREE COPY CIRCLE REPLY CARD NO. 18

Conveyors

Prab Conveyors Inc. — Catalog No. 370 covers this company's line of conveyor equipment. A 31-page book, it is divided into sections: Magnavators; Tube-Veyors; Steel Belt Conveyors; Special Engineered Applications; Engineering Data; General Job Data Sheet. The text is supplemented with photos and diagrams.

FOR A FREE COPY CIRCLE REPLY CARD NO. 19

Induction Motor-Generator

Allis-Chalmers Mfg. Co.—The 200 to 10,000-kw induction motor-generator flywheel sets and applications are detailed in a 4-page brochure. It is pointed out that standard voltages for dc generators for this class of service are 250 volts for smaller and 600 volts for larger ratings.

FOR A FREE COPY CIRCLE REPLY CARD NO. 20

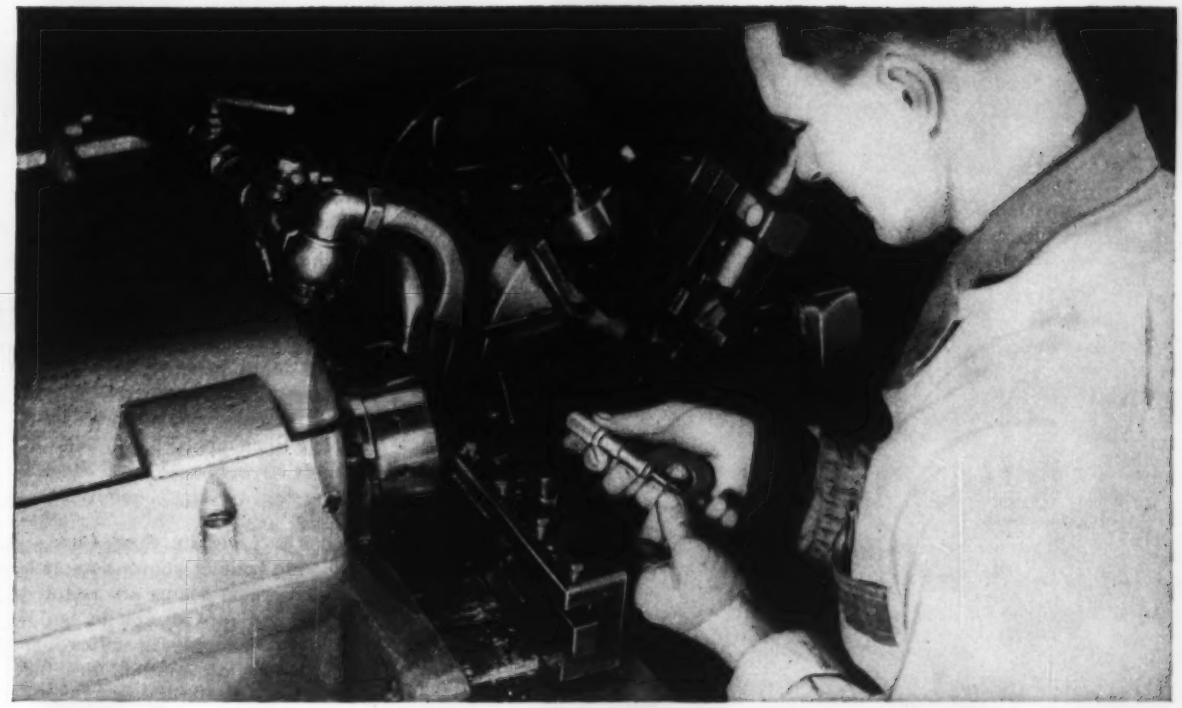
Silver-Zinc Batteries

American Machine & Foundry Co.—A brochure describes the advantages of silver-zinc batteries. The 6-page, 2-color publication includes technical data charts and specifications.

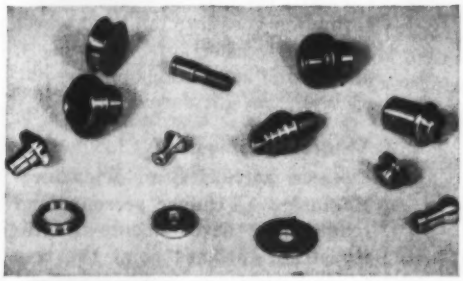
FOR A FREE COPY CIRCLE REPLY CARD NO. 21

High Capacity Gearing

Foote Bros. Gear & Machine Corp.—"Get More For Your Gear Dollar" is a quick picture of the



TOOL LIFE INCREASED 40% USING CITIES SERVICE CUTTING OIL



ONE OIL FOR ALL? After poor results with many cutting oils, the Dunbar Machine & Tool Company discovered all their cutting jobs could be done to perfection using only one oil . . . Cities Service Chillo #44.

NO EYE STRAIN. In addition to a 40% increase in tool life, owner Robert Dunbar found that the transparent characteristics of Chillo #44 help eliminate eye strain. Cutting operation is easily visible to operator.

Production Also Up, Reports Dunbar Machine & Tool Co.

THE PROBLEM . . . The Dunbar Machine & Tool Company had a problem. It seemed impossible to find one oil which would perform economically and efficiently for ALL the jobs required of the firm's automatic screw machines.

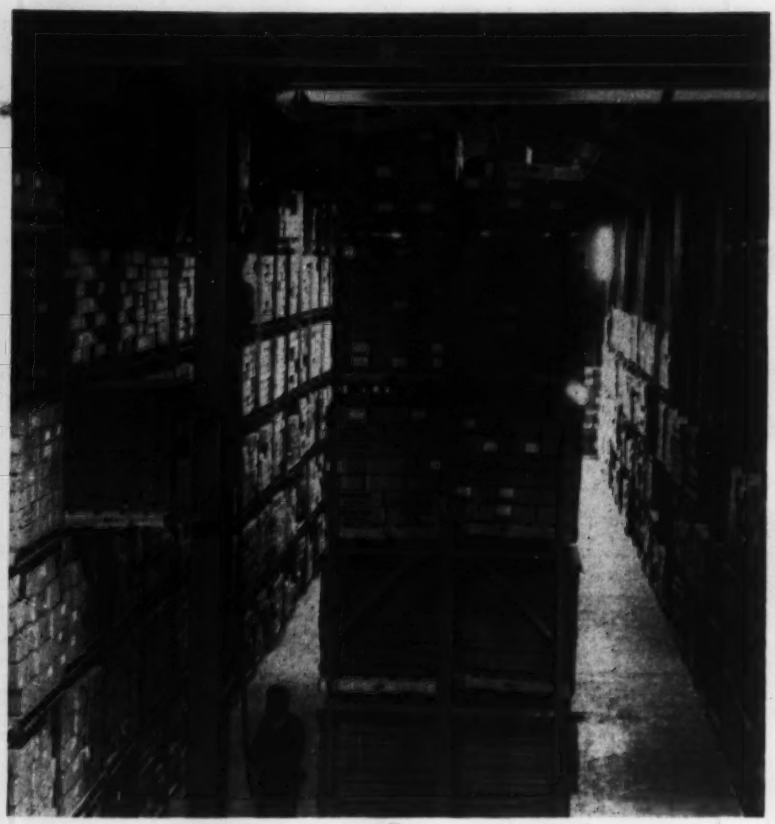
THE SOLUTION . . . After trying many brands of cutting oil, "none of which gave good all-round performance," owner Robert Dunbar called in a Cities Service engineer. After careful analysis of the problem, the engineer recommended Chillo #44 cutting oil.

THE RESULTS . . . Using Chillo #44, the company observed these results: Tool life increased nearly 40% . . . Production increased accordingly . . . Additional savings realized due to chip draining characteristics of oil . . . Holding tolerances no longer any problem . . . Machine clean-up time now insignificant . . . Transparency of oil eliminates eye-strain . . . Less smoke and fumes at high speeds . . . Also excellent for lubricating purposes. Says Mr. Dunbar, "Our results with Chillo #44 permit us to heartily endorse this product."

If you have a cutting oil problem, consult your nearest Cities Service representative or write Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS



Oneida Ltd.

- stores 40" x 48" pallets 23 ft. high—within inches of the top of the trusses—
- has 100% selectivity in placement and removal with 1-man pendant push-button control.

CHICAGO TRAMRAIL TRAK-RAK STORAGE SYSTEM

secured these space-saving, time-saving advantages for Oneida Ltd. with a 3,000 lb. capacity self-contained TRAK-RAK crane operating as a top-running crane on rails mounted directly on top of the racks.

Material is delivered to either end of a storage hut by fork truck or other means. The TRAK-RAK then places it in preselected racks on either side of the aisle and stacks the material up to a height of 23 ft. which is considerably higher than by any other means.

The Oneida Ltd. installation in the storage hut did not permit any overhead handling equipment without additional structural steel to support the crane, and the TRAK-RAK Storage System was made without any alterations to the building whatsoever.

Like all TRAK-RAK installations, the crane permits movement in eight directions —up, down, to both sides; and rotates a full 360° clockwise and counter-clockwise to serve both aisles. The system can be installed in practically any type of storage building and can be furnished as a self-contained unit running on top of the racks or as an underrunning crane system where interlocking transfer can be furnished when desired. Unit can also be supplied with automatic prepositioning devices, with telescoping column, with cab for operator to ride with the load, and with many other features as may be required by the application.

TRAK-RAK Applications is a new 20-page illustrated booklet showing representative operating installations with many different types of materials in many diverse industries. It will be sent to you upon request without obligation. **Write for it today!**

CHICAGO TRAMRAIL CORPORATION

4000 West Washington Boulevard • CHICAGO 24, ILLINOIS

product design opportunities offered by Duti-rated Lifetime Gearing. Case studies are given. Ratings are charted for sizes of gears in production. Another chart compares the hardness and wear life of soft, ordinary, ordinary hard and Duti-rated gearing.

FOR A FREE COPY CIRCLE REPLY CARD NO. 22

Bearing Bushings

Donley Products Inc.—The J. G. Jergens Division has an 8-page catalog of application photos, engineering data, cost-saving ideas, plus questions and answers on uses and performance of their Live Pilot Bearing Bushings.

FOR A FREE COPY CIRCLE REPLY CARD NO. 23

Beams

Jones & Laughlin Steel Corp.—A 20-page booklet shows how J&L light structural beams are adapted to floor and roof design in buildings and other uses. Specifications and design information are included.

FOR A FREE COPY CIRCLE REPLY CARD NO. 24

Grinding Wheels

Norton Co.—Catalog No. 1233 contains a comprehensive listing of standard size diamond grinding wheels and hones. Tables in this 52-page booklet show net price to customer for various quantities. Information goes into diamond wheel markings, selection of wheels, shapes and suggestions on use.

FOR A FREE COPY CIRCLE REPLY CARD NO. 25

Steam Turbines

American Society of Mechanical Engineers — Higher pressure and temperature developments in utility steam turbines point the way for increased economy in industrial turbines. This is shown in an article in *Mechanical Engineering*, "Future Industrial Turbine and Its Application." Special design features that will broaden the utility of the turbine are discussed.

FOR A FREE COPY CIRCLE REPLY CARD NO. 26

Cabinet Lathe

Rivett Lathe & Grinder Inc. — "Machining For Profit," a 12-page lathe catalog, illustrates and explains the working principle of the 918 Steelway precision cabinet lathe. Toolroom precision of the lathe is shown and accessories and attachments are displayed.

FOR A FREE COPY CIRCLE REPLY CARD NO. 27

USE A CARD

FREE CATALOGS and LITERATURE

NEW PRODUCT INFORMATION

INFORMATION ON ADVERTISED PRODUCTS

FREE EDITORIAL CLIP SHEETS

Refractory Application

Tru Gun-All Equipment Co. — The machine described in this 4-page brochure applies concrete, refractories, sand plaster, cement, stucco, insulating concrete, accoustical plaster and other cementitious material.

FOR A FREE COPY CIRCLE REPLY CARD NO. 28

Extruded Shapes

Allegheny Ludlum Steel Corp.—Literature is available covering the hot extruded shapes this company offers in stainless, tool steels, high-temperature alloys and other steels. Advantages, physical characteristics and illustrations of extruded shapes are included.

FOR A FREE COPY CIRCLE REPLY CARD NO. 29

Platform Truck

Elwell-Parker Electric Co.—The 4000-pound capacity, high-lift platform truck with four-wheel steering is discussed in a 4-page folder. Diagrams of turning areas and further details of construction are included.

FOR A FREE COPY CIRCLE REPLY CARD NO. 30

Stainless Fasteners

American Screw Co.—Physical characteristics and uses for stainless steels are set out in a 7-page report. Cold heading and other fabricating techniques that have made new types of fasteners possible are described.

FOR A FREE COPY CIRCLE REPLY CARD NO. 31

Wire Stitching

Acme Steel Co.—Bulletin AD 131 contains 24 pages of information on the ability of wire stitching to make better boxes at lower cost. Different types of box stitching are discussed and illustrated. Acme's machines, accessories and stitching wire are illustrated and described.

FOR A FREE COPY CIRCLE REPLY CARD NO. 32

Descaling Machine

Pangborn Corp. — Bulletin No. 224 discusses Rotoblast machines developed for descaling steel sheets, plates and coils after hot rolling or heat treating. Safety features and economies are explained.

FOR A FREE COPY CIRCLE REPLY CARD NO. 33

Centrifugal Pump

Fostoria Pressed Steel Corp.—The Dynapump, a centrifugal unit driven by a rotating magnetic field instead of a drive shaft, is described in a 4-page brochure. A schematic drawing identifies working parts, and specifications of the standard model are given.

FOR A FREE COPY CIRCLE REPLY CARD NO. 34

Vibration Meter

CEC Instruments Inc.—A 4-page brochure covers the Type 1-110B velocity and displacement measurement vibration meter. Also included are input and output equipment, accessories and associated equipment, specifications and prices.

FOR A FREE COPY CIRCLE REPLY CARD NO. 35

Equipment Replacement

Cincinnati Milling & Grinding Machines Inc.—This company has a bulletin on a continuous replacement program for metalworking equipment. You will be especially interested if your machines are old.

FOR A FREE COPY CIRCLE REPLY CARD NO. 36

Interference Measurement

Empire Devices Products Corp.—This 6-page catalog describes noise meters, distortion analyzers, impulse generators, attenuators and crystal mixers. It is designed to aid manufacturers of all types of electromechanical products in meeting stricter radio-interference regulations imposed by government

For free literature, editorial clips or more information on products described in this section, circle the corresponding number at left. Fill in box below for articles or advertisements not numbered.

ARTICLE OR ADVERTISEMENT — PAGE

NAME — TITLE

COMPANY

PRODUCTS MANUFACTURED

ADDRESS

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Cleveland 13, Ohio

Readers Service Dept.

agencies. Data on each product include design specifications, operating ranges, recommended applications and accessories.

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Tapping Attachments

Automatic Methods Inc.—Three bulletins cover the complete line of lead screw tapping tools: Tapping heads incorporating a lead screw, reversing mechanism and positive depth control in Bulletin No. 601; tapping attachments for converting drill press tapping set-ups to lead screw tapping in Bulletins Nos. 201 and 103.

FOR A FREE COPY CIRCLE REPLY CARD NO. 38

Thread Comparator

Niles-Bement-Pond Co.—Pratt & Whitney Division has prepared a 4-page brochure on their Tri-Roll thread comparator. The illustrated publication lists important advantages and gives specifications.

FOR A FREE COPY CIRCLE REPLY CARD NO. 39

Air Compressor

Cro-plate Co. Inc. — Literature describing the low-cost wet-blast unit explains design and operational features. Application data and before and after photos appear.

FOR A FREE COPY CIRCLE REPLY CARD NO. 40

Machine Tools

Morton Mfg. Co. — An 8-page brochure by this builder of large and small production machine tools includes a rundown of facilities, a brief history of the company, photos and brief descriptions of departments, plus a listing of some of their machine tools.

FOR A FREE COPY CIRCLE REPLY CARD NO. 41

Bearing Alloys

Mueller Brass Co.—This engineering handbook describes the 600 series bearing alloys, including pertinent metallurgical data and a comprehensive chart showing nominal chemical composition, mechanical and physical properties of each of the six grades. One section shows typical applications.

FOR A FREE COPY CIRCLE REPLY CARD NO. 42

Attachment Catalog

South Bend Lathe Works—This 40-page catalog (5418) illustrates and gives full specifications of the company's line of machine tool attachments and accessories.

FOR A FREE COPY CIRCLE REPLY CARD NO. 43

Carbon, Graphite

Union Carbide & Carbon Corp.—National Carbon Co. Division offers copies of their new quarterly publication, *Carbon and Graphite News*. It is made up of a series of 8-page booklets covering significant developments in steel mill and foundry practice and the application of carbon and graphite in the plant. Authorities will be asked to contribute.

FOR A FREE COPY CIRCLE REPLY CARD NO. 44

EDITORIAL REPRINTS:

Product Diversification

New products can replace "losers", help a seasonal or cyclical business, take up slack in production or sales, provide outlets for proprietary items or offer insurance for the future. No. 8 in STEEL's Program for Management Series, page 113, suggests five ways to diversify your product line.

FOR A FREE COPY CIRCLE REPLY CARD NO. 45

Vapor Degreasing

The advantages of this process are many, savings can be substantial. On page 124, you'll find suggestions for evaluating your cleaning requirements. Vapor degreasing may have a place in your operation.

FOR A FREE COPY CIRCLE REPLY CARD NO. 46

High-Damping Alloys

Manganese-copper alloys for machine and structural components have aided in the fight against the detrimental effects of plant noises on people and production. Mechanical properties and their significance are described on page 127.

FOR A FREE COPY CIRCLE REPLY CARD NO. 47

Belt Grinders

Belt swing frame grinders have become a versatile tool for metal fabricators, says the article beginning on page 128. The grinder will tackle a variety of jobs. Many models are homemade. Simple controls, inexpensive set-up help the boom. Some applications are covered.

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9-13-54

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COMPANY _____

PRODUCTS MANUFACTURED _____

ADDRESS _____

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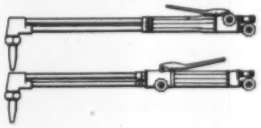
NO JOB TOO HOT ...OR TOO TOUGH *for THESE cutting torches!* *

* VICTOR'S NEW
Series 1000
Series 1100
CUTTING TORCHES



CHOICE OF LEVER POSITION . . . cutting oxygen lever pivots from top rear of handle on Series 1000; from top front on Series 1100. Both Underwriters' approved. Available with 45°, 75°, 90° or 180° heads, to take all VICTOR standard-type tips.

LICK YOUR HOTTEST JOBS
without a flashback . . . solid stainless steel mixing tube absorbs heat slowly, keeps gases below flashpoint.

LAST LONGER UNDER ROUGH, TOUGH USE
because they're made of toughest materials . . . special heat resisting bronze heads, stainless steel tubes, forged brass bodies.

EASIER TO HANDLE, EASIER TO MAINTAIN
. . . hand-fitting oval shaped bodies, perfect balance give precise control. Design is simplicity itself; you can take either model apart completely, then reassemble it, all in less than 5 minutes!

Make your tough jobs easy, your easy jobs a pleasure—
see your VICTOR dealer now!

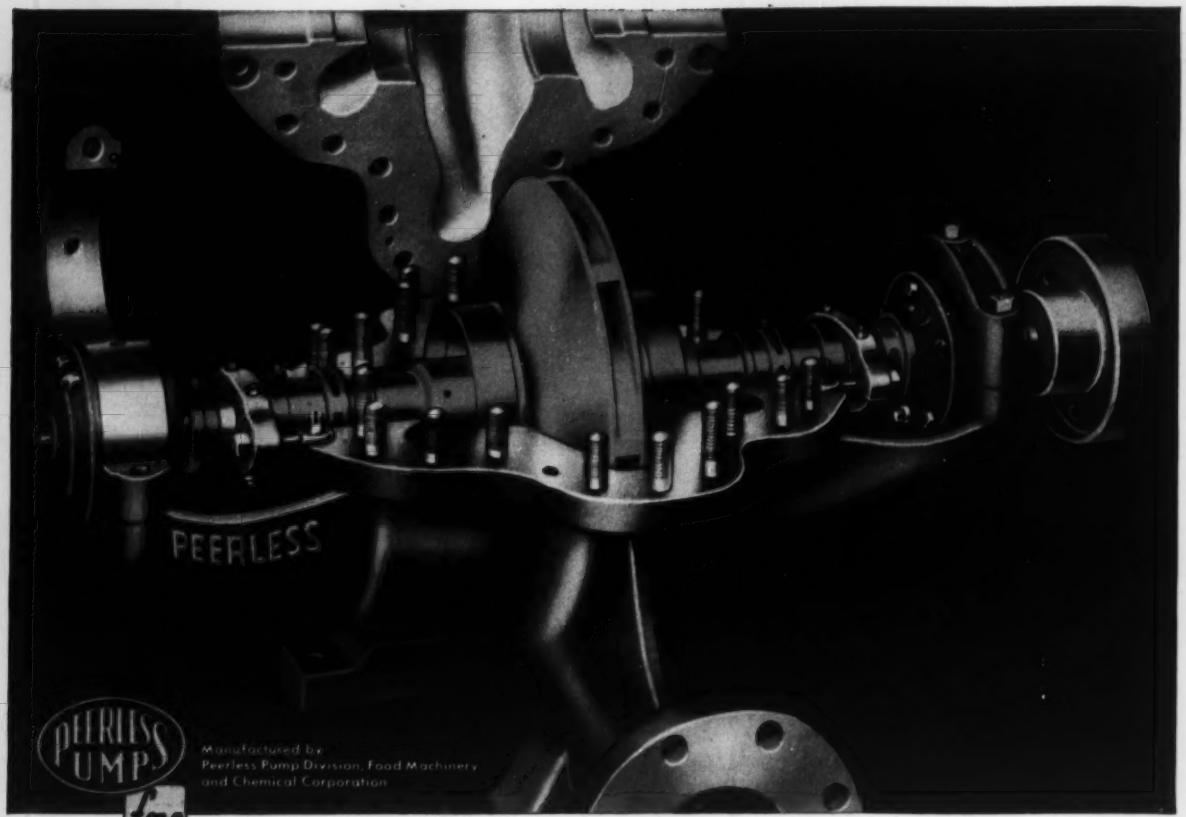
VICTOR

VICTOR EQUIPMENT COMPANY

Mfrs. of welding & cutting equipment; hardfacing rods; blasting nozzles.

3821 Santa Fe Ave.
LOS ANGELES 58

844 Folsom Street
SAN FRANCISCO 7



When fire strikes IT PUMPS PROTECTION

This is the heart of reliable systems that protect against hazards of fire

America's annual loss to the ravages of fire is a staggering amount. Reliable plant and property protection often begins with an independent fire protection system, the heart of which is an approved and reliable fire pump. In the manufacture of fire pumps, rigid construction requirements and operational dependability are paramount. This is why National Bearing Division was selected to supply bronze impellers, wearing rings, and shaft sleeves, for this fire pump and other pumps bearing the Peerless name.

In supplying component fire pump parts to Peerless, a supplier must not only meet the rigid requirements of this manufacturer, but also the strict regulations of Underwriters' Laboratories, Inc.; National Board of Fire Underwriters, Chicago; and the Inspection Department, Associated Factory Mutual Fire Insurance Companies, Boston.

National Bearing's proved ability to mass produce exceptionally fine-grained, non-ferrous castings, free from blow holes and sand inclusions, combined with Peerless Pump Division's exacting engineering and manufacturing standards help build fire pumps, and industrial pumps that can be counted to pump a reliable water supply for fire protection or other plant needs.

If your product requires non-ferrous castings or bearings, National Bearing Division has the foundry facilities, experience and skill that will insure better product performance and may possibly lower product costs.

AMERICAN Brake Shoe COMPANY

NATIONAL BEARING DIVISION

4930 Manchester Avenue, St. Louis 10, Mo.

Plants in: **St. Louis, Mo. • Meadville, Pa. • Niles, Ohio • Portsmouth, Va. • St. Paul, Minn. • Chicago, Ill.**

STEEL
September 13, 1954

Market Outlook

NEW LIFE in the steel business is hinted by the scrap market. After holding at $29 for three consecutive weeks, STEEL's composite on steelmaking grades advanced to $29.75 a gross ton.

Half of all raw materials going into new steel is scrap, so what happens in the scrap market is important.

REVIVING— First mill buying of scrap on the open market for a long time in the Pittsburgh area sent the price $1 a ton over previous quotations. This made the price for No. 1 heavy melting $31 a gross ton delivered. Upon inauguration of trade in steel scrap futures at the Chicago Mercantile Exchange, No. 1 heavy melting scrap was sold as high as $34 a gross ton for delivery in the Chicago switching district in January. That grade is currently quoted at $29-$31 on the open market in Chicago.

HIGHER— The $34 price may be predicated to some extent on delivery in a winter month, when scrap is the most difficult to collect and handle, but that is $4 above the highest price on No. 1 heavy melting in Chicago in the first quarter of this year.

Scrap prices on the East Coast are moving upward, but for a different reason. There the export demand is a buoyant factor. Exports of scrap this month are expected to exceed those of last month. These shipments will continue to comprise heavy melting steel scrap and bundles.

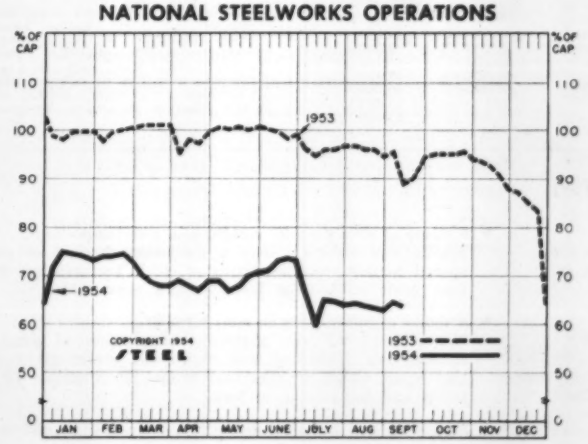
HOLDING UP— Increased strength of steel demand already can be seen in the national steel ingot operating rate. It declined only 1 point during the Labor Day week. If business were dropping, the ingot rate would contract more than that in a holiday week. The rate for the week ended Sept. 12 was 63.5 per cent of capacity.

RETURNING— Contributing to the stronger tone in the steel market is renewed buying by automobile producers. Two of three major auto companies stepped up orders for stainless steel. Stainless producers said the orders were the largest they have received in four months. Other consumers increased their stainless orders slightly early this month. Purchases of stainless wouldn't be made by the automakers unless they have a good idea what their fourth-quarter requirements are, for you can tie up a lot of money quickly in stainless.

BUSIER— At Chicago, steel buying continues to pick up. Mills received more orders during the last week of August than in the last week of July. This applies to most products but particularly to cold-rolled sheets. Evidence of this is the slowing of delivery on cold-rolled sheets and enameling iron sheets by Inland Steel Co. For the second consecutive week, Inland lengthened delivery times on those two products. Now, delivery is quoted at seven weeks, rather than five to six. Mills expect that deliveries will lengthen on structurals and plates. An eastern mill is booked up on sheared plate through October. At Chicago, spot orders for pig iron increased.

PRICE TRENDS— With the steel business showing signs of strengthening, prices are holding steady. STEEL's finished steel price composite stands at $117.77 a gross ton.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended Sept. 12	Change	Same Week 1953	Same Week 1952
Pittsburgh	64.5	— 2.5*	93.5	98.5
Chicago	66	— 1*	100	104
Mid-Atlantic	59	— 2	97.5	98
Youngstown	60	— 4	105	106
Wheeling	70	— 0.5	96	95
Cleveland	68	+ 17*	99.5	104.5
Buffalo	56	0	31.5	104.5
Birmingham	68	+ 6	97	100
New England	50	— 1	85	85
Cincinnati	52	— 0.5	76	92
St. Louis	59.5	+ 3.5	84.5	101
Detroit	63.5	+ 4	104.5	105
Western	78	0	90	100
National Rate	63.5	— 1	88.5	101

INGOT PRODUCTION‡

	Week Ended Sept. 12	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	93.4†	93.4	94.9	125.2
NET TONS (In thousands)	1,500†	1,525	1,525	2,011

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,384,549 in 1954; 2,254,459 in 1953; 2,077,040 in 1952.

Metalworking Outlook—p. 65 Technical Outlook—p. 123

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Sept. 7 1954	Aug. 24 1954	Month Ago	Aug. Average
(1947-1949=100)	144.5	144.5	144.5	144.5

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Sept. 7

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.525
Rails, light, 40 lb	5.917
Tie Plates	5.275
Axles, railway	7.500
Wheels, freight car, 33 in. (per wheel)	48.500
Plates, carbon	4.675
Structural Shapes	4.517
Bars, tool steel, carbon (lb)	0.430
Bars, tool steel, alloy, oil hardening die (lb)	0.525
Bars, tool steel, H.R., alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.115
Bars, tool steel, H.R., alloy, high speed W 18, Cr 4, V 1 (lb)	1.610
Bars, H.R., alloy	8.783
Bars, H.R., stainless, 303 (lb)	0.418
Bars, H.R., carbon	5.023
Bars, reinforcing	5.058
Bars, C.F., carbon	8.174
Bars, C.F., alloy	11.285
Bars, C.F., stainless, 302 (lb)	0.433
Sheets, H.R., carbon	4.880
Sheets, C.R., carbon	5.871
Sheets, galvanized	7.140
Sheets, C.R., stainless, 302 (lb)	0.548
Sheets, electrical	9.350
Strip, C.R., carbon	$7.507
Strip, C.R., stainless, 430 (lb)	0.415
Strip, H.R., carbon	5.088
Pipe, black, buttweld (100 ft)	15.000
Pipe, galv., buttweld (100 ft)	18.507
Pipe, line (100 ft)	146.804
Casing, oil well, carbon (100 ft)	154.216
Casing, oil well, alloy (100 ft)	227.875
Tubes, boiler (100 ft)	‡
Tubing, mechanical, carbon	‡
Tubing, mechanical, stainless, 304 (100 ft)	161.193
Tin, plate, hot-dipped, 1.25 lb	8.433
Tin plate, electrolytic, 0.25 lb	7.133
Black plate, can making quality	6.233
Wire, drawn, carbon	7.938
Wire, drawn, stainless, 430 (lb)	0.545
Bale ties (bundle)	5.860
Nails, wire, 8d common	7.815
Wire, barbed (80-rod spool)	7.109
Woven wire fence (20-rod roll)	16.815

‡Not available.

STEEL's FINISHED STEEL PRICE INDEX*

	Sept. 8 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	194.19	194.19	194.19	189.38	152.90
Index in cents per lb	5.261	5.261	5.261	5.130	4.142

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$117.77	$117.77	$117.77	$115.56	$91.55
No. 2 Fdry, Pig Iron, GT	56.54	56.54	56.54	56.54	46.10
Basic Pig Iron, GT	56.04	56.04	56.04	56.04	45.60
Malleable Pig Iron, GT	57.27	57.27	57.27	57.27	47.27
Steelmaking Scrap, GT	29.75	29.00	28.50	38.67	25.17

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Sept. 8 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.30	4.30	4.30	4.15	3.35
Bars, H.R., Chicago	4.30	4.30	4.30	4.15	3.35
Bars, H.R., del. Philadelphia	4.55	4.55	4.55	5.302	3.83
Bars, C.F., Pittsburgh	5.40	5.40	5.40	5.20	3.95
Shapes, Std., Pittsburgh	4.25	4.25	4.25	4.10	3.25
Shapes, Std., Chicago	4.25	4.25	4.25	4.10	3.25
Shapes, del., Philadelphia	4.53	4.53	4.53	4.38	3.50
Plates, Pittsburgh	4.225	4.225	4.225	4.10	3.40
Plates, Chicago	4.225	4.225	4.225	4.10	3.40
Plates, Coatesville, Pa.	4.225	4.225	4.225	4.35	3.50
Plates, Sparrows Point, Md.	4.225	4.225	4.225	4.10	3.40
Plates, Claymont, Del.	4.225	4.225	4.225	4.55	3.50
Sheets, H.R., Pittsburgh	4.05	4.05	4.05	3.925	3.25
Sheets, H.R., Chicago	4.05	4.05	4.05	3.925	3.25
Sheets, C.R., Pittsburgh	4.95	4.95	4.95	4.775	4.00
Sheets, C.R., Chicago	4.95	4.95	4.95	4.775	4.00
Sheets, C.R., Detroit	5.10	5.10	5.10	4.975	4.20
Sheets, Galv., Pittsburgh	5.45	5.45	5.45	5.275	4.40
Strip, H.R., Pitts.	4.05	4.05	4.05	4.025	3.25
Strip, H.R., Chicago	4.05	4.05	4.05	3.925	3.25
Strip, C.R., Pittsburgh	5.75	5.75	5.75	5.45-5.95	4.00
Strip, C.R., Chicago	6.00	6.00	6.00	5.70	4.00
Strip, C.R., Detroit	5.60-5.90	5.60-5.90	5.60-5.90	5.45-6.05	4.20
Wire, Basic, Pitts.	5.75	5.75	5.75	5.475-5.525	4.15
Nails, Wire, Pittsburgh	6.85	6.85	6.85	6.35-6.55	5.15
Tin plate (1.50 lb), box, Pitts.	$8.95	$8.95	$8.95	$8.95	$7.75
SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$78.00	$78.00	$78.00	$75.50	$61.00
Wire rods, ¼-⅝" Pitts.	4.675	4.675	4.675	4.525	3.40
PIG IRON, Gross Ton					
Bessemer, Pitts.	$57.00	$57.00	$57.00	$57.00	$47.00
Basic, Valley	56.00	56.00	56.00	56.00	46.00
Basic, deld. Phila.	49.66	49.66	49.66	60.75	49.44
No. 2 Fdry, Pitts.	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Valley	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, del. Phila.	50.16	50.16	50.16	61.25	49.94
No. 2 Fdry, Birm.	52.88	52.88	52.88	52.88	39.38
No. 2 Fdry (Birm.) del. Cin.	60.43	60.43	60.43	60.43	45.43
Malleable, Valley	56.50	56.50	56.50	56.50	46.50
Malleable, Chicago	56.50	56.50	56.50	56.50	46.50
Ferromanganese, Duquesne	190.00†	200.00†	200.00†	200.00†	175.00*

*75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$30.50	$29.50	$29.50	$41.50	$27.00
No. 1 Heavy Melt, E. Pa.	28.75	27.50	26.00	39.00	24.00
No. 1 Heavy Melt, Chicago	30.00	30.00	30.00	35.50	24.50
No. 1 Heavy Melt, Valley	30.50	30.50	29.50	39.50	26.50
No. 1 Heavy Melt, Cleve.	28.50	28.50	28.00	35.50	23.00
No. 1 Heavy Melt, Buffalo	26.50	26.50	26.50	41.50	26.25
Rails, Rerolling, Chicago	44.50	44.50	44.50	52.00	38.50
No. 1 Cast, Chicago	35.50	35.50	35.50	35.00	40.50

COKE, Net Ton

Beehive, Furn, Connlsvl.	$14.75	$14.75	$14.75	$14.75	$13.25
Beehive, Fdry, Connlsvl.	16.75	16.75	16.75	16.75	15.75
Oven Fdry, Chicago	24.50	24.50	24.50	24.50	20.00

Daily Nonferrous Price Record

	Price Sept. 1	Last Change	Previous Price	Aug. Avg.	July Avg.	Sept. 1953 Avg.
Copper	30.00	Apr. 12	29.75-30.00	30.000	30.000	29.50
Lead	14.30	Sept. 7	14.05	13.846	13.800	13.540
Zinc	11.50	Sept. 3	11.00	11.000	11.000	10.180
Tin	93.25	Sept. 7	92.75	93.332	96.562	82.410
Nickel	60.00	Jan. 14, 1953	56.50	60.000	60.000	60.000
Aluminum	22.20	Aug. 5, 1954	21.50	22.119	21.500	21.500
Magnesium	27.00	Mar. 9, 1953	24.50	27.000	27.000	27.000

Quotations in cents per pound based on: Copper, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Nickel, electrolytic cathodes, 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99+ %, del.; Magnesium 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.** Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.** Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.** Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.** Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

How much is

FAST, EFFICIENT STRAIGHTENING

worth to you?

Those who manufacture from tube and rod know that fast accurate straightening is an all-important preliminary to efficient production. That's why so many manufacturers rely on Torrington to provide the high-speed tube and rod straighteners best fitted to their particular needs.

Torrington Model 1824 12-roll straightener

Torrington Model 1818 12-roll straightener

SPEEDS: up to 700 feet per minute. **CAPACITY RATINGS:** based on a nominal yield point of 60,000 psi. **RUGGED CONSTRUCTION:** motor, drive and roll assemblies all mounted in one self-contained unit. **EASY ADJUSTMENT:** half of the rolls in each plane individually adjustable by hand wheel. **FLEXIBLE:** overhung rolls with no outboard bearings permit quick and easy changes to handle different shapes and sizes. **MINIMUM MAINTENANCE:** all gearing operates in oil bath. Anti-friction bearings throughout. Gearing and drives fully enclosed.

COMPLETE ENGINEERING SERVICE: Auxiliary mill machinery such as tube and rod straighteners should be selected only after thorough consultation with experienced engineers. Torrington's engineering staff, backed by the knowledge and skill gained while serving the metal mills for almost 70 years, stands ready to work with you to provide the machinery best fitted to your needs. For full information, call or write: Mill Machine Division, Torrington Manufacturing Company, Torrington, Conn.

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Nonferrous Metals

Fourth-quarter squeeze may be felt by users of copper and its alloys. Demand is expected to hit high marks for the year, and supply will shrink

Nonferrous Metal Prices, Pages 180 & 181

FOURTH-QUARTER will be worrisome for users of copper and its alloys. Demand for copper-base mill and foundry products is expected to snap back to set new highs for the year, but supply will shrink because of losses due to mine strikes and seasonal factors.

Consumption of refined copper and scrap will increase to the highest mark for this year, says Business & Defense Services Administration in the first of a quarterly series of copper reports. It also predicts "a moderate rise" in deliveries of brass mill products, "an increase" in copper wire mill product shipments, and "a substantial increase" in brass and bronze foundry product shipments.

Back to Market—Much of the optimism for fourth-quarter activity is based on completion of inventory liquidation by durable goods manufacturers initiated last November. If these manufacturers' shipments increase in the fourth quarter as expected, their purchases of mill and foundry products should be at a related rate instead of below that rate—as it has been in recent months.

Brass mills and copper wire mills both show only a little over one month's backlog of unfilled orders, about one-third to one-half the amount that existed at the beginning of 1953. Copper wire products show a better trend of shipments than brass mill products because of record construction activity. Brass mills have been hurt more by lower military requirements and slowed buying by durable goods makers.

Looking Up—Tide is turning in the latter segment. Measured against current sales, inventories reached a high mark of 2.32 months at the end of February, 1954, and then headed downward.

Brass and bronze foundries hit a 2.5-year low in scrap and ingot consumption during the second quarter, and the third quarter hasn't been any better. Improvement in the fourth quarter is looked for.

Selling for the Future

The copper and brass industry is embarked on a long-range campaign to show customers, prospects and the public that theirs is a mighty useful metal and that there's plenty of it for all future needs (see p. 73).

Copper & Brass Research Association estimates domestic copper requirements of the U. S. will be slightly more than 2 million tons in 1960 and 2.3 million tons in 1970. The forecast is based on a 1951-1953 average per capita consumption of 22.8 pounds (18 pounds of refined copper, 4.8 pounds of scrap), projected upwards in accordance with average annual per capita consumption increases since 1920.

From a supply standpoint, the association figures a potential surplus of one-half million tons could be possible in 1958. Where will all this extra copper come from? Mine production, scrap reclamation and imports accounted for 52.5 per cent, 24.8 per cent and 22.7 per cent of supply, respectively, in the first half of 1954.

Mines—In the first half of this year, mines brought forth 423,704 tons. In the next three years 11 major projects will be brought into operation, increasing net output 250,000 tons by 1956. This would be enough to provide 60.5 per cent of estimated requirements of 1,940,000 tons for that year.

Scrap—Eighty per cent of total copper consumption in one year is potentially returnable to market over a 35-year cycle. Encouraging to supply is that full scrap potential is never approached in normal times, allowing accumulation of surplus.

Imports—Net imports have been running at 300,000 to 500,000 tons yearly, which is 20 to 30 per cent of total world production outside the U. S. There is sufficient elasticity in foreign copper supply to compensate for any foreseeable fluctuations of domestic supply and demand.

Reserves—There is no present indication that a limit to reserves of copper ore is being approached.

Brass, Bronze Prices Up

Tightening in copper mine supply pulled the noose closer in scrap, too. As a result, brass and bronze ingot makers quoting the lower end of a 1.5-cent price range jumped their quotations to the top. With scrap buying prices stiff, the ingot makers pricing low were trying to build volume in a lackluster market before Labor Day. Now they're pricing to meet overhead. New quotations appear on page 180.

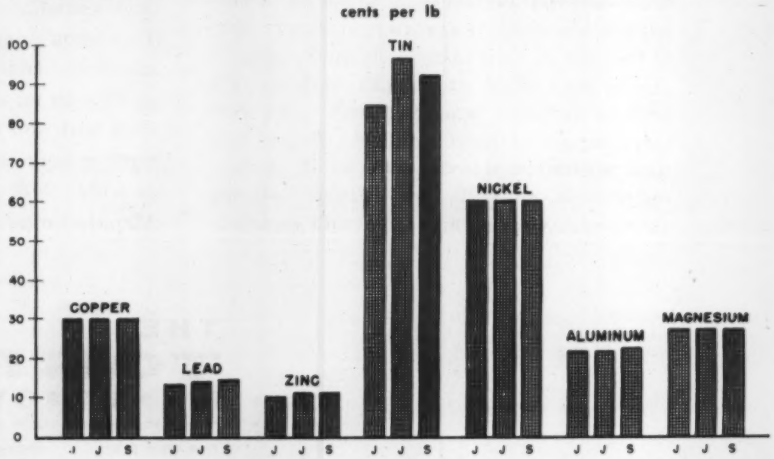
Market Memos

- New products from Alcoa are coming thick and fast. This week it's a new electrode for inert-gas shielded arc welding.
- Consumption of aluminum scrap in the first six months of 1954 slid 17 per cent below the corresponding period of 1953.

The Trend of Things

NONFERROUS PRICES

Jan. 1, July 1, and Sept. 1, 1954



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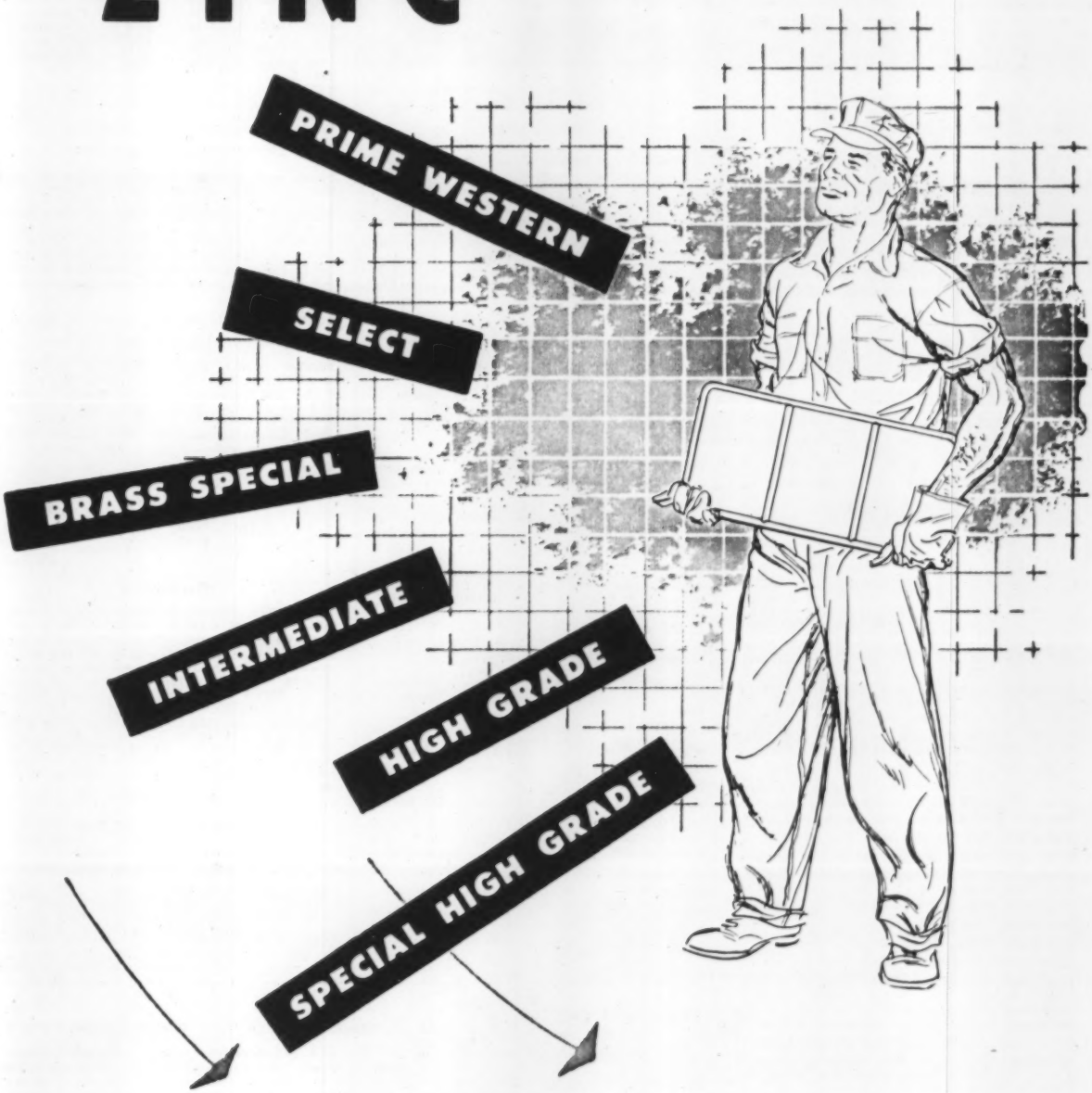
every grade of ZINC
for urgent military and
civilian requirements



AMERICAN ZINC SALES COMPANY

Distributors for

AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, O. Chicago St. Louis New York

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 22.20, pigs 20.50 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 24; No. 43, 5% Si, 23.8; No. 142, 4% Cu, 25.1; No. 195, 4.5% Cu, 0.8% Si, 24.5; No. 214, 3.8% Mg, 25.2; No. 356, 7% Si, 0.3% Mg, 23.9.

Antimony: R.M.M. brand, 99.5% 28.50, Lone Star brand, 29.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.; Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb del.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg; $2.62 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 30.00 del. Conn. Valley, 30.00 del. Midwest; Lake 30.00 del; Fire refined 29.75 del.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $145-$150 per troy oz.

Lead: Common 14.30, chemical 14.40, corroding 14.40, St. Louis; N. Y. basis, add 0.20.

Lithium: 98%, $11-$14 per lb, depending on quantity.

Magnesium: 99.8%, self-palletizing pig 27.00; notched ingot 27.75, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., and Madison, Ill., add 1.20 for pig and 1.25 for ingot. Sticks, 1.3 in. diameter, 46.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, G and R 32.50; alloy M 34.50, 10,000 lb or more f.o.b. Freeport, Tex., or Madison, Ill. Add 1.20 for Port Newark, N. J.

Mercury: Open market, spot, New York, $293-$298, nom., per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3.40 per lb; pressed ingot $4.06 per lb; sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked 60.00; 25-lb pigs 62.65; "XX" nickel shot 63.65; "F" nickel shot or ingots for addition to cast iron, 60.00; prices f.o.b. Port Colborne, Ont., including import duty, New York basis, add 0.92.

Osmium: $140-$150 per troy oz nom.

Palladium: $21 per troy oz.

Platinum: $84-$87 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $125 per troy oz.

Ruthenium: $75-$80 per troy oz.

Selenium: 99.5%, $5-$6 per lb.

Sodium: 16.50, carlots; 17.00 l.c.l.

Tantalum: Sheet, rod $39.00 per lb; powder $33.50 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 93.25.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.) $4.72; grade A-2 (0.5% Fe max) $4.46 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000 lb lots $4.95 per lb, f.o.b. shipping point; less than 1000 lb $5.10 99+% hydrogen reduced, $4.65. Treated ingots $6.70.

Zinc: Prime Western 11.50, brass special 11.75, intermediate 12.00, E. St. Louis, freight allowed over 0.50 per pound. High grade 12.85, special high grade 13.00, die casting alloy ingot 15.50, del.

Zirconium: Sponge $10 per lb; powder electronics grade $15, flash grade $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston Alloy 20.75-21.25; No. 12 foundry alloy (No. 2 grade) 19.75-20.25; 5% silicon alloy, 0.60 Cu max., 23.25-23.50; 13 alloy, 0.60 Cu max., 23.25-23.50; 195 alloy 21.25-22.25; 108 alloy 20.25-20.75; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 21.00-21.50; grade 2, 20.00-20.50; grade 3, 19.00-19.50; grade 4, 18.00-18.50.

Brass Ingot: Red brass, No. 115, 28.50; tin bronze No. 225, 40.00; No. 245, 33.75; high-leaded tin bronze, No. 305, 33.00; No. 1 yellow, No. 405, 24.25; manganese bronze No. 421, 26.75.

Magnesium Alloy Ingot: AZ63A, 31.50; AZ91B, 27.00; AZ91C, 31.50; AZ92A, 31.50.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.68; rod, bar, wire, $1.65.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 35.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weatherproof, 100,000 lb, 36.28; 30,000 lb, 36.53; l.c.l. 37.03. Magnet wire del., 15,000 lb or more 41.83; l.c.l. 42.58.

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more $19.00 per cwt; pipe, full coils $19.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $11; forging billets $6; hot-rolled and forged bars, $6.

ZINC

(Prices per lb c.l., f.o.b. mill) Sheets 23.00, ribbon zinc in coils, 18.50-20.50; plates 18.00-22.25.

ZIRCONIUM

Plate $27; H.R. strip $28; C. R. strip $35; forged or H.R. bars $27; wire, 0.015 in., 1 cent per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R.	86.5	67.5	92.5
Strip, C.R.	92.5	70.5	98.5
Plate, H.R.	84.5	66.5	90.5
Rod, Shapes	82.5	65.5	88.5
Seamless Tubes	115.5	100.5	137.5
Shot, Blocks	...	60.0	...

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or across flats	Round 11S-T3	Round 17S-T4	Hexagonal 11S-T3	Hexagonal 17S-T4
Drawn				
0.125	59.6	57.9	...	...
0.156-0.172	50.6	48.9	...	...
0.188	50.6	48.9	...	62.4
0.219-0.234	47.9	46.2	...	...
0.250-0.281	47.9	46.2	...	59.5
0.313	47.9	46.2	...	56.8
Cold-finished				
0.375-0.531	46.6	44.9	56.2	53.4
0.563-0.688	46.6	44.9	53.4	50.2
0.750-1.000	45.5	43.8	48.9	47.3
1.063	45.5	43.8	...	45.7
1.125-1.500	43.8	42.1	47.3	45.7
Rolled				
1.563	42.7	41.0	...	...
1.625-2.000	42.1	40.4	...	44.1
2.125-2.500	41.1	39.4	...	...
2.750-3.375	39.9	38.2	...	...

ALUMINUM

Sheets and Circles: 2S and 3S mill finish c.l. (30,000 lb base; freight allowed over 499 lb)

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	12-48	34.9	...	...
0.135-0.096	12-48	35.4	...	...
0.095-0.077	12-48	36.1	33.6	38.6
0.076-0.061	12-48	36.7	33.8	38.8
0.060-0.048	12-48	37.2	34.1	39.2
0.047-0.038	12-48	37.7	34.6	39.6
0.037-0.030	12-48	38.1	35.0	40.3
0.029-0.024	12-48	38.7	35.3	40.8
0.023-0.019	12-36	39.4	36.1	41.6
0.018-0.017	12-36	40.2	36.7	42.5
0.016-0.015	12-36	41.1	37.5	43.7
0.014	12-24	42.1	38.5	45.0
0.013-0.012	12-24	43.3	39.2	46.0
0.011	12-24	44.3	40.4	47.6
0.010-0.0095	12-24	45.5	41.5	49.2
0.009-0.0085	12-24	46.8	43.0	51.3
0.008-0.0075	12-24	48.4	44.2	53.1
0.007	12-18	49.9	45.7	55.4
0.006	12-18	51.5	47.1	60.4

*72-180 in. lengths. †26 in. max. dia.

ALUMINUM

Plates and Circles: Thickness 0.250-3.0 in., 24-60 in. width or dia, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
2S-F, 3S-F	34.7	38.9
5052-F	34.7	38.9
4S-F	35.7	40.6
5052-F	37.4	42.4
6061-T6	38.6	43.0
2024-T4*	40.8	46.9
7075-T6*	48.6	55.2

*24-48 in. widths or dia., 72-180 in. lengths.

ALUMINUM

Forging Stock: Round, Class 1, 43.8-34.4, in specific lengths 36-144 in., diameters 0.375-8 in.; rectangles and squares. Class 1, 50.2-38.4 in random lengths 0.375-4.0 in. thick, widths 0.750-10.0 in.

Pipe: A.S.A. Schedule 40, alloy 63S-T6, 20 ft length, plain ends, 90,000 lb base, per 100 ft.

Nom. pipe size, in.		Nom. pipe size, in.	
¾	$15.05	2	$ 46.30
1	23.65	4	127.70
1¼	32.00	6	228.50
1½	38.25	8	343.80

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 94.00, 0.064-in. 73.00, 0.125-in. 60.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot rolled AZ31, 53.00, 20,000 lb or more 0.250-in. and over, widths to 48 in., lengths to 144 in.; raised pattern floor plate, 59.00, 20,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in., 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ¼-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 66.20.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 2S clippings 13.50; low copper clippings 13.50; mixed clippings 11.50; old sheet 10.50; borings and turnings 6.50; pistons and struts 8.00; crankcases 10.50; industrial castings 10.50.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.38b	45.98c	....	48.44	26.000	26.000	25.250
Yellow Brass	41.72	34.50d	42.26	44.63	19.750	19.500	18.000
Red Brass, 85%	45.44	45.38	45.98	48.25	23.000	22.750	22.250
Low Brass, 80%	44.47	44.41	45.01	47.28	22.125	21.875	21.375
Naval Brass	45.78	40.07	52.80	48.92	18.250	18.000	17.500
Commercial Bronze, 90%	46.95	46.89	47.49	49.51	23.875	23.625	23.125
Nickel Silver, 10%	55.36	59.43g	57.60	....	23.625	23.375	11.813
Phosphor Bronze, A, 5%	66.58	67.08	67.08	68.23	26.125	25.875	24.875
Silicon Bronze	52.71	51.90	52.75	70.11e	25.125	24.875	24.125
Manganese Bronze	49.48	43.62	54.06	....	18.250	18.000	17.500
Munts Metal	43.98	39.77	....	....	18.625	18.375	17.875

a. Cents per lb f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

Copper and Brass: Heavy copper and wire, No. 1 24.50-25.00; No. 2 copper 23.00-23.25; light copper 21.00-21.25; No. 1 composition red brass 19.00-19.50; No. 1 composition turnings 18.50-19.00; mixed brass turnings 11.50-12.00; new brass clippings 18.00; No. 1 brass rod turnings 15.00; light brass 11.50-12.00; heavy yellow brass 14.00; new brass rod ends 16.00; auto radiators, unsweated 15.00; cocks and faucets 16.00-16.50; brass pipe 16.50-17.00.

Lead: Heavy 11.50-11.75; battery plate 6.25-6.50; linotype and stereotype 13.50-13.75; electrotype 11.75-12.00; mixed babbitt 12.50-12.75.

Magnesium: Clippings 18.50-19.50; clean castings 17.50-18.50; iron castings, not over 10% removable Fe, 16.50-17.50.

Monel: Clippings 23.00-25.00; old sheet 21.00-23.00; turnings 16.00-18.00; rods 23.00-25.00.

Nickel: Sheets and clips 60.00-65.00; rolled anodes 60.00-65.00; turnings 40.00; rod ends 60.00-65.00.

Tin: No. 1 pewter 55.00-60.00; block tin pipe 75.00-80.00; No. 1 babbitt 50.00.

Zinc: Old zinc, 5.00-5.25; new die cast scrap, 4.75-5.00; old die cast scrap, 3.25-3.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 2S, 3S clippings 15.50-15.75; 51S, 52S clippings 15.25-15.75; 14S, 17S, 24S clippings 14.50-14.75; mixed clipping 14.00-14.50; old sheet 13.00-13.50; old cast 13.00-13.50; clean old cable, free of steel 15.00-15.75; borings and turnings 13.25-13.75.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 42.00; light scrap 37.00.

Copper, Brass: No. 1 copper 27.25; No. 2 copper 25.75; light copper 24.25; refinery brass (60% copper) per dry copper content 24.25.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 27.00; No. 2 copper 25.25-25.50; light copper 23.75-24.00; No. 1 composition borings 20.50-21.00; No. 1 composition solids 21.50-22.00; heavy yellow brass solids 17.00-17.50; yellow brass turnings 16.00-16.50; radiators 18.00-18.25.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $1.70 per lb.

Copper: Flat-rolled 45.04, oval 44.54, 2000-5000 lb; electrodeposited 39.78, cast 42.04, 5000-10,000 lb lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb $1.115; 200-499 lb $1.10; 500-999 lb $1.095; 1000 lb or more $1.09.

Zinc: Bar 18.50, bar or flat top 17.50 ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100 lb drums.

Chromic Acid: Less than 10,000 lb 28.50; over 10,000 lb 27.50.

Copper Cyanide: Under 1000 lb 63.90, 1000 lb and over 61.90.

Copper Sulphate: 100-6000 lb 11.35; 6000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulphate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,000 lb 30.00; 36,00 lb and over 29.00.

Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.50; 25,000 oz and over 77.325.

Sodium Cyanide: Egg, under 1000 lb 19.80; 1000-19,900 lb 18.80; 20,000 lb and over 17.80; granular, add 1-cent premium to above.

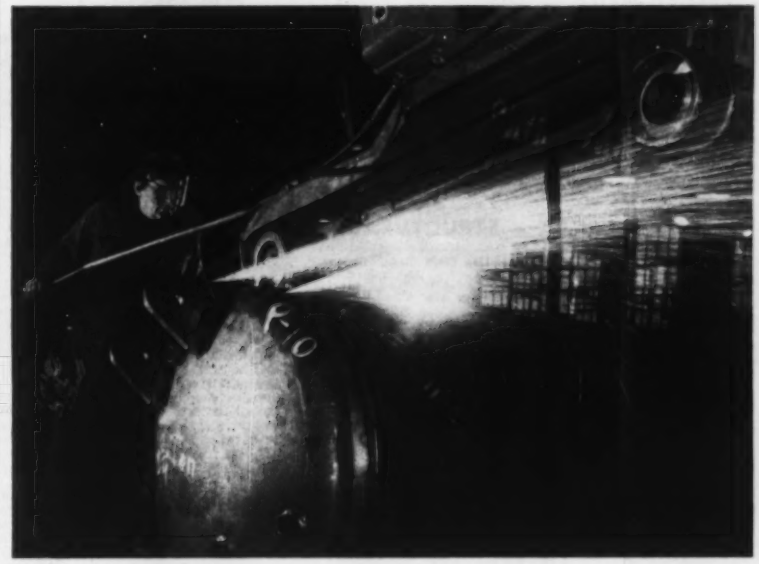
Sodium Stannate: Less than 100 lb 71; 100-600 lb 56.7; 700-1900 lb 54.3; 2000-9900 lb 52.5; 10,000 lb or more 51.4.

Stannous Chloride: (Anhydrous): Less than 50 lb $1.57; 50 lb $1.23; 100-300 lb $1.08; 400-900 lb $1.055; 100-1900 lb $1.031; 2000-4900 lb 99.4; 5000-19,000 lb 99.3; 20,000 lb and over 87.2.

Stannous Sulphate: Less than 5 lb $1.269; 50 lb 96.9; 100-1900 lb 94.9; 2000 lb and over 92.9.

Zinc Cyanide: Under 1000 lb 54.30, 1000 lb and over 52.30.

How would you SOLVE IT?



1 PRODUCTION PROBLEM: To speed production and cut costs of removing extra-thick weld seams from 2¾ ton industrial boiler drums. Drums are made of 1" thick steel sections, welded together. Wickes Boiler Co. was using grinding wheels—found them slow, unsatisfactory.

2 SOLUTION: A 3M Representative suggested that this Saginaw, Michigan, manufacturer switch to the 3M Method using Three-M-ite Resin Bond belts installed on a swing grinder. Manufacturer found that each 3M belt removed these extra-heavy-duty welds faster, better.

3 RESULTS: An immediate production increase with much higher quality finishes. (Note: manufacturer experimented with a "Brand X" belt, found it averaged only 9 feet of weld per belt . . . 3M belt removed 30 feet!) A 3M Representative can help you solve your grinding and finishing problems, too. Call him today. There's no cost or obligation.

Made in U.S.A. by Minnesota Mining and Manufacturing Company. General Offices: St. Paul 6, Minn. In Canada: London, Ont., Can. Export: 122 E. 42nd St., New York City. Makers of "Scotch" Pressure-Sensitive Tapes, "Scotch" Brand Magnetic Tape, "3M" Adhesives, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-Slip Surfacing.

WANT MORE INFORMATION?

Minnesota Mining and Mfg. Co.
Dept. 5-94, St. Paul 6, Minn.

☐ Send me free booklet: "Weld Grinding & Blending with 3M Abrasives"

☐ Please have 3M Representative call.

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

My Distributor is _____

3M

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on page 183. Key to footnotes, page 185.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$61.50

INGOTS, Alloy (NT)

Detroit R7 .....$66.00
Houston B5 .....73.00
Midland,Pa. C18 .....65.00
Munhall,Pa. U5 .....65.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Aliquippa,Pa. J5 ....$64.00
Bessemer,Pa. U5 .....64.00
Buffalo R2 .....64.00
Clairton,Pa. U5 .....64.00
Ensley,Ala. T2 .....64.00
Fairfield,Ala. T2 .....64.00
Fontana,Calif. K1 ....72.00
Gary,Ind. U5 .....64.00
Johnstown,Pa. B2 ....64.00
Lackawanna,N.Y. B2 ..64.00
Munhall,Pa. U5 .....64.00
So.Chicago,Ill. R2,U5 ..64.00
So.Duquesne,Pa. U5 ..64.00
Youngstown R2 .....64.00

Carbon, Forging (NT)

Aliquippa,Pa. J5 ....$78.00
Bessemer,Pa. U5 ....78.00
Buffalo R2 .....78.00
Canton,O. R2 .....80.00
Clairton,Pa. U5 .....78.00
Conshohocken,Pa. A3 ..83.00
Ensley,Ala. T2 .....78.00
Fairfield,Ala. T2 .....78.00
Fontana, Calif. K1 ....86.00
Gary,Ind. U5 .....78.00
Geneva,Utah. C11 ....78.00
Houston B5 .....85.00
Johnstown,Pa. B2 ....78.00
Lackawanna,N.Y. B2 ..78.00
Los Angeles B3 .....87.50
Munhall,Pa. U5 .....78.00
Seattle B3 .....91.50
So.Chicago R2,U5,W14 .78.00
So.Duquesne,Pa. U5 ..78.00
So.SanFrancisco B3 ...87.50

Alloy, Forging (NT)

Bethlehem,Pa. B2 ....$86.00
Buffalo R2 .....86.00
Canton,O. R2, T7 .....86.00
Conshohocken,Pa. A3 ..93.00
Detroit R7 .....88.00
Fontana,Calif. K1 ....105.00
Gary,Ind. U5 .....86.00
Houston B5 .....93.00
Ind.Harbor,Ind. Y1 ..86.00
Johnstown,Pa. B2 ....86.00
Lackawanna,N.Y. B2..86.00
LosAngeles B3 .....106.00
Massillon,O. R2 .....86.00
Midland,Pa. C18 .....86.00
Munhall,Pa. U5 .....86.00
So.Chicago R2,U5,W14.86.00
So.Duquesne,Pa. U5 ...86.00
Struthers,O. Y1 .....86.00
Warren,O. C17 .....86.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 .....$96.50
Canton,O. R2 .....96.50
Cleveland R2 .....96.50
Gary,Ind. U5 .....96.50
So.Chicago R2, W14 ..96.50
So.Duquesne,Pa. U5 ..96.50

SKELP

Aliquippa,Pa. J5 .....4.00
Fontana,Calif. K1 ....4.775
Munhall,Pa. U5 .....3.90
Warren,O. R2 .....3.90
Youngstown R2, U5 ....3.90

WIRE RODS

AlabamaCity,Ala. R2 ..4.675
Aliquippa,Pa. J5 ....4.675
Alton,Ill. L1 .....4.85
Buffalo B11, W12 ....4.675
Cleveland A7 .....4.675
Donora,Pa. A7 .....4.675
Fairfield,Ala. T2 ....4.675
Fontana,Calif. K1 ....5.475
Houston S5 .....5.075
IndianaHarbor,Ind. Y1 4.675
Johnstown,Pa. B2 ....4.675
Joliet,Ill. A7 .....4.675
KansasCity,Mo. S5 ....5.015
Kokomo,Ind. C16 ....4.775
LosAngeles B3 .....5.475
Minnequa,Colo. C10 ...4.925
Monessen,Pa. P7 .....4.675
No.Tonawanda,N.Y.B11 4.675
Pittsburg,Calif. C11 ..5.325
Portsmouth P12 .....4.675
Roebling,N.J. R5 .....4.775
So.Chicago,Ill. R2 ....4.675
Sterling,Ill.(1) N15 ....4.675
Sterling,Ill. N15 .....4.775
Struthers,O. Y1 .....4.675
SparrowsPoint,Md. B2 4.775
Torrance,Calif. C11 ...5.475
Worcester,Mass. A7 ..4.975

STRUCTURALS

Carbon Steel Stand. Shapes

Aliquippa,Pa. J5 .....4.25
Bessemer,Ala T2 .....4.25
Bethlehem,Pa. B2 .....4.30
Birmingham C15 .....4.25
Clairton,Pa. U5 .....4.25
Fairfield,Ala. T2 .....4.25
Fontana,Calif. K1 .....4.90
Gadsden,Ala (31) R2 ..4.28
Gary,Ind. U5 .....4.25
Geneva,Utah C11 .....4.25
Houston S5 .....4.65
Ind.Harbor,Ind. I-2 ....4.25
Johnstown, Pa. B2 .....4.30
KansasCity,Mo. S5 ....4.85
Lackawanna,N.Y. B2 ..4.30
LosAngeles B3 .....4.95
Minnequa,Colo. C10 ....4.70
Munhall,Pa. U5 .....4.25
Niles,Calif. P1 .....4.80
Phoenixville,Pa. P4 ....3.95
Seattle B3 .....5.00
So.Chicago U5, W14 ..4.25
So.SanFrancisco B3 ....4.90
Torrance,Calif. C11 ....4.95
Weirton,W.Va. W6 ....4.25

Wide Flange

Bethlehem,Pa. B2 .....4.30
Clairton,Pa. U5 .....4.25
Fontana,Calif. K1 .....5.25
Lackawanna,N.Y. B2 ..4.30
Munhall,Pa. U5 .....4.25
Phoenixville,Pa. P4 ....3.95
So.Chicago,Ill. U5 ....4.25

Alloy Stand. Shapes

Clairton,Pa. U5 .....5.20
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.20
Houston S5 .....5.60
Munhall,Pa. U5 .....5.20
So.Chicago,Ill. U5 .....5.20

H.S., L.A. Stand. Shapes

Aliquippa,Pa. J5 .....6.40
Bessemer,Ala. T2 .....6.40
Bethlehem,Pa. B2 .....6.45
Clairton,Pa. U5 .....6.40
Fairfield,Ala. T2 .....6.40
FontanaCalif. K1 .....7.05
Gary,Ind. U5 .....6.40
Geneva,Utah, C11 .....6.40
Houston S5 .....6.80
Ind.Harbor,Ind. I-2, Y1.6.40
Johnstown,Pa. B2 .....6.45
KansasCity,Mo. S5 .....7.00
Lackawanna,N.Y. B2 ..6.45
LosAngeles B3 .....7.10
Munhall,Pa. U5 .....6.40
Seattle B3 .....7.15
So.Chicago,Ill. U5, W14.6.40
So.SanFrancisco B3 ....7.05
Struthers,O. Y1 .....6.40

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ...6.45
Munhall,Pa. U5 .....6.40
So.Chicago,Ill. U5 .....6.40

PILING

BEARING PILES

Munhall,Pa. U5 .....4.25
So.Chicago,Ill. U5 .....4.25

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ...5.075
Lackawanna,N.Y. B2 ..5.075
Munhall,Pa. U5 .....5.075
So.Chicago,Ill U5 ....5.075

PLATES

PLATES, Carbon Steel

Aliquippa,Pa. J5 .....4.225
Ashland,Ky.(15) A10 ..4.225
Bessemer,Ala. T2 .....4.225
Buffalo(31) R2 .....4.255
Clairton,Pa. U5 .....4.225
Claymont,Del. C22 ....4.225
Cleveland J5 .....4.225
Cleveland(31) R2 .....4.285
Coatesville,Pa. L7 .....4.225
Conshohocken,Pa. A3 ..4.225
Ecorse,Mich. G5 .....4.375
Fairfield,Ala. T2 .....4.225
Gadsden,Ala.(31) R2 ..4.255
Fontana,Calif.(30) K1.4.875
Gary,Ind. U5 .....4.225
Geneva,Utah C11 .....4.225
GraniteCity,Ill. G4 ....4.425
Harrisburg,Pa. C5 ....3.975
Houston S5 .....4.625
Ind.Harbor,Ind. I-2, Y1 4.225
Johnstown,Pa. B2 .....4.225
Lackawanna,N.Y. B2 ..4.225
LoneStar,Tex. L6 .....4.40
Mansfield,O. E6 .....4.225
Minnequa,Colo. C10 ...5.075
Munhall,Pa. U5 .....4.225
Newport,Ky. N9 .....4.225
Pittsburgh J5 .....4.225
Riverdale,Ill. A1 .....4.225
Seattle B3 .....5.125
Sharon,Pa. S3 .....4.225
So.Chicago,Ill.(31) R2..4.295
So. Chicago,Ill U5,W14.4.225
SparrowsPoint,Md. B2..4.225
Steubenville,O. W10 ....4.225
Warren,O.(31) R2 .....4.265
Weirton,W.Va. W6 ....4.225
Youngstown(31) R2 ....4.275
Youngstown U5, Y1 ..4.225

PLATES, Carbon Abras. Resist.

Fontana,Calif. K1 ....6.025
Geneva,Utah C11 .....5.375

PLATES, Wrought Iron

Economy,Pa. B14 .....9.80

PLATES,High-Strength Low-Alloy

Aliquippa,Pa. J5 .....6.45
Bessemer,Ala. T2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland J5, R2 .....6.45
Conshohocken,Pa. A3 ..6.45
Ecorse,Mich. G5 .....6.60
Fairfield,Ala. T2 .....6.45
Fontana,Calif.(30) K1 ..7.15
Gary,Ind. U5 .....6.45
Geneva,Utah C11 .....6.45
Houston S5 .....6.85
Ind.Harbor,Ind. I2, Y1.6.45
Johnstown,Pa. B2 .....6.45
Lackawanna,N.Y. B2...6.45
LosAngeles B3 .....7.35
Munhall,Pa. U5 .....6.45
Pittsburgh J5 .....6.45
Seattle B3 .....7.35
Sharon,Pa. S3 .....6.45
So.Chicago,Ill. U5, W14.6.45
SparrowsPoint,Md. B2..6.45
Youngstown U5, Y1.....6.45

PLATES, Alloy

Claymont,Del. C22 .....5.80
Coatesville,Pa. L7 .....5.80
Fontana,Calif. K1 .....6.45
Gary,Ind. U5 .....5.80
Houston S5 .....6.20
Johnstown,Pa. B2 .....5.80
Munhall,Pa. U5 .....5.80
Newport,Ky. N9 .....5.80
Seattle B3 .....6.70
Sharon,Pa. S3 .....5.80
So.Chicago,Ill. U5, W14.5.80
SparrowsPoint,Md. B2 ..5.80

FLOOR PLATES

Cleveland J5 .....5.275
Conshohocken,Pa. A3 ..5.275
Harrisburg,Pa. C5 .....5.15
Ind.Harbor,Ind. I-2 ....5.275
Munhall,Pa. U5 .....5.275
So.Chicago,Ill. U5 .....5.275

PLATES, Ingot Iron

Ashland c.l. (15) A10..4.475
Ashland l.c.l. (15) A10.4.975
Cleveland c.l. R2 .....4.825
Warren,O. c.l. R2 .....4.825

BARS

BARS, Hot-Rolled Carbon

Aliquippa,Pa. J5 .....4.30
Alton,Ill. L1 .....4.50
Atlanta,Ga. A11 .....4.50
Bessemer,Ala. T2 .....4.30
Birmingham C15 .....4.30
Buffalo(31) R2 .....4.33
Canton,O.(31) R2 .....4.46
Clairton,Pa. U5 .....4.30
Cleveland(31) R2 .....4.36
Ecorse,Mich. G5 .....4.45
Emeryville,Calif. J7 ...5.05
Fairfield,Ala. T2 .....4.30
Fairless,Pa. U5 .....4.45
Fontana,Calif.K1 .....5.00
Gary,Ind. U5 .....4.30
Gadsden,Ala.(31) R2 ..4.33
Houston S5 .....4.70
Ind.Harbor,Ind. I-2, Y1.4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 .....4.90
Lackawanna,N.Y. B2 ...4.30
LosAngeles B3 .....5.00
Massillon,O.(31) R2 ....4.46
Milton,Pa. M18 .....4.30
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....4.85
N.Tonawanda,N.Y. B11.4.30
Pittsburg,Calif. C11 ...5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
Seattle B3, N14, P23 ...5.05
So.Chicago(31) R2 .....4.37
So.Chicago U5, W14 ....4.30
So.Duquesne,Pa. U5 ....4.30
SoSanFran.,Calif. B3 ..5.05
Sterling,Ill.(1) N15 ....4.30
Sterling,Ill. N15 .....4.40
Struthers,O. Y1 .....4.30
Torrance,Calif. C11 ....5.00
Warren,O. (31) R2 .....4.34
Weirton,W.Va. W6 .....4.30
Youngstown U5 .....4.30
Youngstown(31) R2 ....4.35

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ....5.075
Buffalo(31) R2 .....5.105
Canton,O. T7 .....5.075
Canton,O.(31) R2 .....5.115
Chicago(31) R2 .....5.145
Clairton,Pa. U5 .....5.075
Detroit R7 .....5.175
Ecorse,Mich. G5 .....5.225
Fontana,Calif. K1 ....6.125
Fairless,Pa. U5 .....5.225
Gary,Ind. U5 .....5.075
Houston S5 .....5.475
Ind.Harbor,Ind. I-2, Y1 5.075
Johnstown,Pa. B2 ....5.075
KansasCity,Mo. S5 ....5.675
Lackawanna,N.Y. B2..5.075
LosAngeles B3 .....6.125
Massillon,O.(31) R2 ...5.115
Midland,Pa. C18 .....5.075
So.Chicago U5, W14 ...5.075
So.Duquesne,Pa. U5 ..5.075
Struthers,O. Y1 .....5.075
Warren,O. C17 .....5.075
Youngstown U5 .....5.075

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa, Pa. J5 .....6.45
Bessemer,Ala T2 .....6.45
Bethlehem,Pa. B2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland(31) R2 .....6.45
Ecorse,Mich. G5 .....6.60
Fairfield,Ala. T2 .....6.45
Fontana,Calif. K1 .....7.70
Gary,Ind. U5 .....6.45
Houston S5 .....6.85
Ind.Harb.,Ind. I-2, Y1.6.45
Johnstown,Pa. B2 .....6.45
KansasCity,Mo. S5 .....7.05
Lackawanna,N.Y. B2 ..6.45
LosAngeles B3 .....7.15
Pittsburgh J5 .....6.45
Seattle B3 .....7.20
So.Chicago W14 .....6.45
So.Duquesne,Pa. U5 ...6.45
So.SanFrancisco B3 ....7.20
Struthers,O. Y1 .....6.45
Warren,O.(31) R2 .....6.45
Youngstown U5 .....6.45

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa. B2 .....4.45

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 .....4.30
Atlanta A11 .....4.50
Fontana,Calif. K1 .....5.00
Niles,Calif. P1 .....4.85
SanFrancisco S7 .....4.70

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 .....5.20
Gary,Ind. U5 .....5.20
Houston S5 .....5.60
KansasCity S5 .....5.80
Youngstown U5 .....5.20

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M12 ...5.40
BeaverFalls,Pa.(31) R2.5.46
Camden,N.J. P13 .....5.85
Carnegie,Pa. C12 .....5.40
Chicago W18 .....5.40
Cleveland A7, C20 ....5.40
Detroit R7 .....5.55
Detroit B5, P17 .....5.60
Donora,Pa A7 .....5.40
Elyria,O. W8 .....5.40
FranklinPark,Ill. N5 ...5.40
Gary,Ind. (31) R2 .....5.47
GreenBay,Wis. F7 .....5.40
Hammond,Ind. L2, M13.5.40
Hartford,Conn.(31) R2 ..5.90
Harvey,Ill. B5 .....5.40
LosAngeles(31) R2 ....6.85
LosAngeles S30 .....6.85
Mansfield,Mass B5 ....5.95
Massillon,O. R8 .....5.40
Massillon,O.(31) R2 ....5.44
Monaca,Pa. S17 .....5.40
Newark,N.J. W18 .....5.85
NewCastle,Pa.(17) B4 ..5.40
Pittsburgh J5 .....5.40
Plymouth,Mich. P5 ....5.65
Putnam,Conn. W18 ....5.95
Readville,Mass. C14 ....5.95
St.Louis,Mo. M5 .....5.70
So.Chicago,Ill. W14 ....5.40
SpringCity,Pa. K3 .....5.85
Struthers,O. Y1 .....5.40
Waukegan,Ill. A7 .....5.40
Worcester,Mass. W19 ...5.85
Youngstown F3, Y1 ...5.40

BARS, Cold-Finished Alloy (Turned and Ground)

Cumberland,Md.(5) C19.4.65

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ...6.625
BeaverFalls,Pa. M12 ..6.625
BeaverFalls,Pa. R2 ...6.685
Bethlehem,Pa. B2 .....6.625
Buffalo B5 .....6.625
Camden,N.J. P13 .....6.80
Canton,O. T7 .....6.625
Carnegie,Pa. C12 .....6.625
Chicago W18 .....6.625
Cleveland A7, C20 ....6.625
Detroit R7 .....6.725
Detroit B5, P17 .....6.825
Donora,Pa. A7 .....6.625
Elyria,O. W8 .....6.625
Gary,Ind.(31) R2 .....6.695
Hammond,Ind. L2, M13 6.625
Hartford,Conn.(31) R2.6.925
Harvey,Ill. B5 .....6.625
Lackawanna,N.Y. B2..6.625
LosAngeles S30 .....8.30
Mansfield,Mass. B5 ...6.925
Massillon,O. R8 .....6.625
Massillon,O.(31) R2 ...6.665
Midland,Pa. C18 .....6.625
Monaca,Pa. S17 .....6.625
Newark,N.J. W18 .....6.80
Plymouth,Mich. P5 ....6.825
So.Chicago W14 .....6.625
SpringCity,Pa. K3 .....6.80
Struthers,O. Y1 .....6.625
Warren,O. C17 .....6.625
Waukegan,Ill. A7 .....6.625
Worcester,Mass. A7 ..6.925
Youngstown F3, Y1 ...6.625

BARS, Reinforcing (fabricators)

Atlanta A11 .....4.50
Birmingham C15 .....4.30
Buffalo(31) R2 .....4.33
Cleveland(31) R2 .....4.36
Emeryville,Calif. J7 ....5.05
Fairfield,Ala, T2 .....4.30
Fairless,Pa. U5 .....4.45
Fontana,Calif. K1 .....5.00
Ft.Worth,Tex.(42) T4 ..4.90
Gadsden,Ala.(31) R2...4.33
Gary,Ind. U5 .....4.30
Houston S5 .....4.70

Ind.Harbor,Ind. I-2, Y1..4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 .....4.90
Lackawanna,N.Y. B2 ...4.30
LosAngeles B3 .....5.00
Milton,Pa. M18 .....4.30
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....4.85
Pittsburg,Calif. C11 ....5.00
Pittsburgh J5 .....4.30
SandSprings,Okla. S5 ..5.15
Seattle B3, N14, P23...5.05
So.Chicago(31) R2 ....4.37
So.Duquesne,Pa. U5 ...4.30
So.SanFrancisco B3 ....5.05
SparrowsPoint,Md. B2 ..4.30
Sterling,Ill.(1) N15 ....4.30
Sterling,Ill. N15 .....4.40
Struthers,O. Y1 .....4.30
Torrance,Calif. C11 ....5.00
Youngstown U5 .....4.30
Youngstown(31) R2 ....4.35

BARS, Reinforcing (Fabricated; to consumers)

Johnstown, ¼-1" B2 ..5.70
KansasCity S5 .....6.50
LosAngeles B3 .....5.95
Marion, O. P11 .....5.55
Seattle B3, N14, P23 ...6.15
So.SanFrancisco B3 ....6.00
SparrowsPt. ½-1" B2..5.70
Williamsport,Pa. S19 ..5.60

RAIL STEEL BARS

Avis,Pa.(3) J8 .....4.25
ChicagoHts.(3) C2, I-2.4.20
ChicagoHts.(4) C2, I-2.4.30
Ft.Worth,Tex.(26) T4 ..4.75
Franklin,Pa. (3) F5 ....4.05
Franklin,Pa. (4) F5 ....4.15
Marion,O.(3) P11 .....4.15
Moline,Ill.(3) R2 .....4.30
Tonawanda(3,4) B12 ...4.30
Williamsport,Pa.(3) S19.4.30

BARS, Wrought Iron

Economy,Pa.(S.R.) B14 10.85
Economy,Pa.(D.R.) B14 13.50
Economy(Staybolt) B14 13.80
McK.Rks.(S.R.) L5 ..10.85
McK.Rks.(D.R.) L5 ..14.75
McK.Rks.(Staybolt) L5 16.25

SHEETS

SHEETS, Hot-Rolled Steel (18 gage and heavier)

Allenport,Pa. P7 .....4.05
Ashland,Ky.(8) A10 ....4.05
Cleveland J5, R2 .....4.05
Conshohocken,Pa. A3 ..4.10
Detroit(8) M1 .....4.20
Ecorse,Mich. G5 .....4.20
Fairfield,Ala. T2 .....4.05
Fairless,Pa. U5 .....4.10
Fontana,Calif. K1 ....4.825
Gadsden,Ala. R2 .....4.05
Gary,Ind. U5 .....4.05
Geneva,Utah C11 .....4.15
GraniteCity,Ill. G4 ....4.25
Houston S5 .....4.45
Ind.Harbor,Ind. I-2, Y1.4.05
Irvin,Pa. U5 .....4.05
Kokomo,Ind. C16 .....4.15
Lackawanna,N.Y. B2 ...4.05
Mansfield,O. E6 (37) ...4.05
Mansfield,O. E6 (38) ...4.80
Munhall,Pa. U5 .....4.05
Newport,Ky. N9 .....4.05
Niles,O. N12 .....4.05
Pittsburg,Calif. C11 ....4.75
Pittsburgh J5 .....4.05
Portsmouth,O. P12 .....4.05
Riverdale,Ill. A1 .....4.05
Sharon,Pa. S3 .....4.05
So.Chicago,Ill. W14 ....4.05
SparrowsPoint,Md. B2 ..4.05
Steubenville,O. W10 ....4.05
Warren,O. R2 .....4.05
Weirton,W.Va. W6 ....4.05
Youngstown U5, Y1 ....4.05

SHEETS, H.R. (19 ga. lighter)

Gadsden,Ala. R2 .....5.35
Kokomo,Ind. C16 .....5.20
Niles,O. N12 .....4.95

SHEETS, H.R. (14 ga. heavier) High-Strength Low-Alloy

Cleveland J5, R2 .....6.10
Conshohocken,Pa. A3 ..6.15
Ecorse,Mich. G5 .....6.25
Fairfield,Ala. T2 .....6.10
Fairless,Pa. U5 .....6.15
Fontana,Calif. K1 ....6.875
Gary,Ind. U5 .....6.10
Ind.Harbor,Ind. I-2, Y1.6.10
Irvin,Pa. U5 .....6.10
Lackawanna(35) B2 ....6.10
Munhall,Pa. U5 .....6.10
Pittsburgh J5 .....6.10
Sharon,Pa. S3 .....6.10
So.Chicago,Ill. U5 .....6.10
SparrowsPoint(36) B2 ..6.10
Warren,O. R2 .....6.10
Weirton,W.Va. W6 .....6.10
Youngstown U5, Y1 ....6.10

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ....4.30
Cleveland R2 .....4.65
Ind.Harbor,Ind. I-2 ....4.30
Warren,O. R2 .....4.65

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....4.95
Cleveland J5, R2 .....4.95
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....4.95
Fairless,Pa. U5 .....5.00
Follansbee,W.Va. F4 ...4.95
Fontana,Calif. K1 .....6.05
Gary,Ind. U5 .....4.95
GraniteCity,Ill. G4 ....5.15
Ind.Harbor,Ind. I-2, Y1.4.95
Irvin,Pa. U5 .....4.95
Lackawanna,N.Y. B2 ..4.95
Middletown,O. A10 .....4.95
Pittsburg,Calif. C11 ....5.90
Pittsburgh J5 .....4.95
Portsmouth,O. P12 .....4.95
SparrowsPoint,Md. B2 ..4.95
Steubenville,O. W10 ....4.95
Warren,O. R2 .....4.95
Weirton,W.Va. W6 .....4.95
Youngstown Y1 .....4.95

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2 .....7.50
Ecorse,Mich. G5 .....7.65
Fairless,Pa. U5 .....7.55
Fontana,Calif. K1 .....8.55
Gary,Ind. U5 .....7.50
IndianaHarbor,Ind. Y1..7.50
Irvin,Pa. U5 .....7.50
Lackawanna(37) B2 ...7.50
Pittsburgh J5 .....7.50
SparrowsPoint(38) B2 ..7.50
Warren,O. R2 .....7.50
Weirton,W.Va. W6 ....7.50
Youngstown Y1 .....7.50

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....5.55
Middletown,O. A10 .....5.45
Warren,O. R2 .....5.55

SHEETS, Culvert (16 Ga.)	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.50	....
Canton,O. R2	6.25	7.10
Fairfield T2	6.25	6.50
Gary,Ind. U5	6.25	6.50
Ind.Harbor I-2	6.25	6.50
Irvin,Pa. U5	6.25	6.50
Kokomo,Ind. C16	6.35	....
MartinsFry.,O. W10	6.25	....
Newport,Ky. N9	6.25	6.50
Pitts.,Calif. C11	7.00	....
SparrowsPt. B2	6.25	....

SHEETS, Culvert	Pure Iron
Ashland,Ky. A10	6.75
Fairfield,Ala. T2	6.50
MartinsFerry,O. W10	6.50

SHEETS, Galvanized Steel Hot-dipped

Ashland,Ky. A10 .....5.45*
Butler,Pa. A10 .....5.45†
Canton,O. R2 .....5.45‡
Dover,O. R1 .....5.45‡
Fairfield,Ala. T2 .....5.45*
Gadsden,Ala. R2 .....5.45‡
Gary,Ind. U5 .....5.45*
GraniteCity,Ill. G4 ....5.65‡
Ind.Harbor,Ind. I-2 ...5.45†
Irvin,Pa. U5 .....5.45†
Kokomo,Ind. C16 .....5.55‡
MartinsFerry,O. W10 ..5.45*
Middletown,O. A10 ....5.45†
Newport,Ky. N9 .....5.45†
Niles,O. N12 .....5.45‡
Pittsburg,Calif. C11 ..6.20‡
SparrowsPt.,Md. B2 ..5.45‡
Steubenville,O. W10 ...5.45‡
Weirton,W.Va. W6 ....5.45*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Galvanized High-Strength Low-Alloy

Irvin,Pa. U5 .....8.20
SparrowsPoint(39) B2 ..8.20

SHEETS, Galvannealed Steel

Canton,O. R2 .....5.85
Irvin,Pa. U5 .....5.85
Kokomo,Ind. C16 .....5.95†
Newport,Ky. N9 .....6.00
Niles,O. N12 .....6.00

SHEETS, Galvanized Ingot Iron

Ashland,Ky.(8) A10 ....5.70
Canton,O. R2 .....6.20

SHEETS, Galvanized Ingot Iron (Hot-dipped continuous)

Ashland,Ky. A10 .....5.70
Butler,Pa. A10 .....5.70
Middletown,O. A10 ....5.70

SHEETS, Electrogalvanized

Cleveland(28) R2 .....6.30
Niles,O.(28) R2 .....6.30
Weirton,W.Va. W6 ....5.975

SHEETS, Aluminum Coated

Butler,Pa. A10 .....8.625

SHEETS, Enameling Iron

Ashland,Ky.(8) A10 ...5.375
Cleveland R2 .....5.375
Gary,Ind. U5 .....5.375
GraniteCity,Ill. G4 ....5.575
Ind.Harbor,Ind. I-2 ...5.375
Irvin,Pa. U5 .....5.375
Middletown,O. A10 ....5.375
Niles,O. N12 .....5.375
Youngstown Y1 .....5.375

BLUED STOCK, 29 ga.

Follansbee,W.Va. F4 ..7.375
Follansbee(23) F4 .....6.60
Yorkville,O. W10 .....7.375

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 5.85
Gary,Ind. U5 .....5.85
Mansfield,O. E6 .....5.85
Middletown,O. A10 ....5.85
Niles,O. N12 .....5.85
Weirton,W.Va. W6 ....5.85

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....6.25

SHEETS, Well Casing

Fontana,Calif. K1 ....6.325

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div. Buffalo-Eclipse Corp.
B12 Buffalo Steel Div., H. K. Porter Co. Inc.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C31 Chester Blast Furnace Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Corp.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng. HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Nrthwst.Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallugical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P23 Pacific Steel Rolling

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div. Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless WeldedProducts
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Allenport, Pa. P7 ....4.05
Alton, Ill. L1 ....4.225
Ashland, Ky. (8) A10 ....4.05
Atlanta A11 ....4.25
Bessemer, Ala. T2 ....4.05
Birmingham C15 ....4.05
Bridgeport, Conn. (10) S15 4.05
Buffalo (27) R2 ....4.05
Conshohocken, Pa. A3 ..4.175
Detroit M1 ....4.20
Ecorse, Mich. G5 ....4.20
Fairfield, Ala. T2 ....4.05
Fontana, Calif. K1 ....4.825
Gadsden, Ala. (27) R2 ....4.05
Gary, Ind. U5 ....4.05
Houston, Tex. S5 ....4.45
Ind. Harbor, Ind. I-2, Y1 4.05
Johnstown, Pa. (25) B2 ..4.05
KansasCity, Mo. (9) S5 ..4.65
Lackw'na, N.Y. (25) B2..4.05
LosAngeles (25) B3 ....4.80
Milton, Pa. M18 ....4.05
Minnequa, Colo. C10 ....5.15
NewBritain (10) S15 ....4.05
N. Tonawanda, N.Y. B11 4.05
Pittsburg, Calif. C11 ....4.80
Portsmouth, O. P12 ....4.05
Riverdale, Ill. A1 ....4.05
SanFrancisco S7 ....5.00
Seattle (25) B3, P23 ....5.05
Seattle N14 ....5.05
Sharon, Pa. S3 ....4.05
So. Chicago, Ill. W14 ....4.05
So. SanFrancisco (25) B3 4.80
SparrowsPoint, Md. B2 ..4.05
Sterling (1) N15 ....4.05
Sterling, Ill. N15 ....4.15
Torrance, Calif. C11 ....4.80
Warren, O. R2 ....4.05
Weirton, W.Va. W6 ....4.05
Youngstown U5 ....4.05

STRIP, Hot-Rolled Alloy

Bridgeport, Conn. (10) S15 6.45
Carnegie, Pa. S18 ....6.70
Fontana, Calif. K1 ....8.10
Gary, Ind. U5 ....6.70
Houston, Tex. S5 ....7.10
KansasCity, Mo. S5 ....7.30
LosAngeles B3 ....7.90
NewBritn., Conn. (10) S15 6.45
Newport, Ky. N9 ....6.70
Seattle P23 ....7.80
Sharon, Pa. S3 ....6.70
So. Chicago W14 ....6.70
Youngstown U5 ....6.70

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer, Ala. T2 ....6.15
Conshohocken, Pa. A3 ..6.15
Ecorse, Mich. G5 ....6.30
Fairfield, Ala. T2 ....6.15
Fontana, Calif. K1 ....7.25
Gary, Ind. U5 ....6.15
Houston S5 ....6.55
Ind. Harbor, Ind. I-2, Y1 6.15
KansasCity, Mo. S5 ....6.75
Lackawanna, N.Y. B2 ..6.15
LosAngeles (25) B3 ....6.90
Seattle (25) B3, P23 ....7.15
Sharon, Pa. S3 ....6.15
So. SanFrancisco (25) B3 6.90
SparrowsPoint, Md. B2 ..6.15
Warren, O. R2 ....6.15
Weirton, W.Va. W6 ....6.15
Youngstown U5, Y1 ....6.15

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10 ...4.30
Warren, O. R2 ....4.65

STRIP, Cold-Rolled Carbon

Anderson, Ind. G6 ....5.75
Baltimore T6 ....5.75
Bridgeport, Conn. (10) S15 5.75
Cleveland A7, J5 ....5.75
Dearborn, Mich. D3 ....5.90
Detroit D2, M1 ....5.90
Detroit P20 ....5.95
Dover, O. G6 ....5.75
Ecorse, Mich. G5 ....5.90
Follansbee, W.Va. F4 ...5.75
Fontana, Calif. K1 ....7.65
FranklinPark, Ill. T6 ...5.85
Ind. Harbor, Ind. I-2 ....6.00
Indianapolis C8 ....5.90
Lackawanna, N.Y. B2 ...5.75
LosAngeles C1 ....7.80
Mattapan, Mass. T6 ....6.30
Middletown, O. A10 ....5.75
NewBedford, Mass. R10..6.20
NewBritain (10) S15 ...5.75
NewCastle, Pa. B4, E5 ..5.75
NewHaven, Conn. A7 ...6.50
NewHaven, Conn. D2 ....6.20
Pawtucket, R.I. R3 ....6.40
Pawtucket, R.I. N8 ....6.30
Pittsburgh J5 ....5.75
Portsmouth, O. P12 ....5.75
Riverdale, Ill. A1 ....5.85
Rome, N.Y. (32) R6 ....5.75
Sharon, Pa. S3 ....5.75
SparrowsPt. Md. B2 ...5.75
Trenton, N.J. R5 ....7.00
Wall'ford, Conn. W2 ....6.20
Warren, O. B9, R2, T5..5.75
Weirton, W.Va. W6 ....5.75
Worcester, Mass. A7 ....6.60
Youngstown C8, Y1 ....5.75

STRIP, Cold-Rolled Alloy

Carnegie, Pa. S18 ....12.45
Cleveland A7 ....12.45
Dover, O. G6 ....12.45
Fontana, Calif. K1 ....14.55
FranklinPark, Ill. T6 ..12.45
Harrison, N.J. C18 ....12.45
Mattapan, Mass. T6 ....12.80
Pawtucket, R.I. N8 ....12.80
Sharon, Pa. S3 ....12.45
Worcester, Mass. A7 ...12.75
Youngstown C8 ....12.90

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	5.75	8.35	9.30	11.45	14.15
Bridgeport, Conn. (10) S15.	5.75	8.05	9.30	11.15	13.85
Bristol, Conn. W1	...	...	9.30	11.45	....
Carnegie, Pa. S18	...	8.05	9.00	11.15	13.85
Cleveland A7	5.75	8.05	9.00	11.15	13.85
Cleveland C7	...	8.05	9.00	11.15	13.85
Dearborn, Mich. D3	5.90	8.25	9.20	....	....
Detroit D2	5.90	8.25	9.20	10.95	....
Dover, O. G6	5.85	8.05	9.00	11.15	13.85
FranklinPark, Ill. T6	5.85	8.05	9.00	11.15	13.85
Harrison, N.J. C18	...	...	9.30	11.45	14.15
Indianapolis C8	6.00	8.20	9.00	11.15	13.85
Mattapan, Mass. T6	6.30	8.35	9.30	11.45	14.15
NewBritn., Conn. (10) S15.	5.75	8.05	9.00	11.15	13.85
NewCastle, Pa. B4	5.75	8.05	9.00	11.15	....
NewCastle, Pa. E5	5.75	8.05	9.00	11.15	13.85
NewHaven, Conn. D2	6.20	8.35	9.30	11.25	....
NewYork W3	...	8.35	9.30	11.45	14.15
Pautucket, R.I. N8	6.30	8.35	9.30	11.45	14.15
Riverdale, Ill. (1) A1	5.85	8.05	9.00	11.15	13.85
Rome, N.Y. (32) R6	5.75	8.05	9.00	10.95	13.25
Sharon, Pa. S3	5.75	8.05	9.00	11.15	13.85
Trenton, N.J. R5	...	8.35	9.30	11.45	14.15
Wallingford, Conn. W2	6.20	8.35	9.30	11.45	14.15
Warren, O. T5	5.75	8.05	9.00	10.95	13.25
Weirton, W.Va. W6	5.75	8.05	9.00	11.15	13.85
Worcester, Mass. A7	6.60	8.35	9.30	11.45	14.15
Worcester, Mass. T6	6.30	8.35	9.30	11.45	14.15
Youngstown C8	5.85	8.05	9.00	11.15	13.85
Spring Steel (Tempered)					
Bristol, Conn. W1	...	...	12.90	15.60	....
Buffalo W12	...	...	12.90	....	....
Harrison, N.J. C18	...	...	12.90	15.60	19.00
NewYork W3	...	...	12.90	15.60	19.00
Trenton, N.J. R5	...	...	12.90	15.60	19.00
Worcester, Mass. T6	...	...	12.90	15.60	19.00
Worcester, Mass. W12	...	...	12.90	....	....
Youngstown C8	...	...	13.25	15.95	19.35

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7, J5 ....8.60
Dearborn, Mich. D3 ....8.75
Dover, O. G6 ....8.60
Ecorse, Mich. G5 ....8.75
Lackawanna, N.Y. B2 ..8.425
Pittsburgh J5 ....8.60
Sharon, Pa. S3 ....8.60
SparrowsPoint, Md. B2..8.425
Warren, O. R2 ....8.60
Weirton, W.Va. W6 ....8.60
Youngstown Y1 ....8.60

STRIP, Cold-Rolled Ingot Iron

Warren, O. R2 ....6.35

STRIP, Electrogalvanized

Dover, O. G6 ....5.75
Youngstown C8 ....5.75

TIGHT COOPERAGE HOOP

Atlanta A11 ....4.775
Riverdale, Ill. A1 ....4.625
Sharon, Pa. S3 ....4.475
Youngstown U5 ....4.475

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom, W.Va W10	...	...	9.10	10.10	11.00
Brackenridge, Pa. A4	...	...	9.10	10.10	11.00
IndianaHarbor, Ind. I-2	8.025	8.50	9.10	10.10	....
Mansfield, O. E6	8.025	8.50	9.10	10.10	11.00
Newport, Ky. N9	8.025	8.50	9.10	10.10	11.00
Niles, O. N12	8.025	8.50	9.10	10.10	....
Vandergrift, Pa. U5	...	8.50	9.10	10.10	11.00
Warren, O. R2	8.025	8.50	9.10	10.10	11.00
Zanesville, O. A10	...	8.50	9.10	10.10	11.00

C.R. COILS & CUT LENGTHS, (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge, Pa. A4	...	...	9.85	10.85	11.75
GraniteCity, Ill. G4	8.425*	8.95*	9.55*	10.55*	....
IndianaHarbor, Ind. I-2	8.225	8.75*	9.35*	....	....
Vandergrift, Pa. U5	...	9.25†	9.85†	10.85†	11.75†
Vandergrift, Pa. U5	8.225*	8.75*	9.35*	10.35*	11.25*
Warren, O. R2	8.225†	9.25	9.85	10.85	11.75
Zanesville, O. A10	...	9.25	9.85	10.85	11.75

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom, W.Va. W10	11.95	12.50	13.00	14.00
Brackenridge, Pa. A4	11.95	....	....	....
Newport, Ky. N9	11.95	....	....	....
Vandergrift, Pa. U5	11.95	12.50	13.00	14.00
Zanesville, O. A10	11.95‡	12.50‡	13.00‡	14.00‡

C.R. COILS & CUT LENGTHS	T-100	T-90	T-80	T-73	T-72
Butler, Pa. A10	....	....	16.60	17.10	....
Vandergrift, Pa. U5	14.00	15.00	16.60	17.10	12.70
Warren, O. R2	....	....	....	....	12.70‡

* Semiprocessed. † Fully processed only. ‡ Coils annealed; semiprocessed ½c lower. ‡ Coils, ¾-cent higher.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$7.40	$7.65	$8.05
Fairfield, Ala. T2	7.50	7.75	8.15
Fairless, Pa. U5	7.50	7.75	8.15
Gary, Ind. U5	7.40	7.65	8.05
GraniteCity, Ill. G4	7.60	7.85	8.25
IndianaHarbor, Ind. 1-2, Y1	7.40	7.65	8.05
Irvin, Pa. U5	7.40	7.65	8.05
Niles, O. R2	7.40	7.65	8.05
Pittsburg, Calif. C11	8.15	8.40	8.80
SparrowsPoint, Md. B2	7.50	7.75	8.15
Weirton, W.Va. W6	7.40	7.65	8.05
Yorkville, O. W10	7.40	7.65	8.05

TIN PLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa, Pa. J5	$8.70	$8.95
Fairfield, Ala. T2	8.80	9.05
Fairless, Pa. U5	8.80	9.05
Gary, Ind. U5	8.70	8.95
Ind. Har. I-2, Y1	8.70	8.95
Irvin, Pa. U5	8.70	8.95
Pitts., Cal. C11	9.45	9.70
Sp. Pt., Md. B2	8.80	9.05
Warren, O. R2	8.70	8.95
Weirton, W.Va. W6	8.70	8.95
Yorkville, O. W10	8.70	8.95

BLACK PLATE (Base Box)

Aliquippa, Pa. J5 ....$6.50
Fairfield, Ala. T2 ....6.60
Fairless, Pa. U5 ....6.60
Gary, Ind. U5 ....6.50
GraniteCity, Ill. G4 ....6.70
Ind. Harbor, Ind. I-2, Y1 6.50
Irvin, Pa. U5 ....6.50
Niles, O. R2 ....6.50
Pittsburg, Calif. C11 ....7.25
Warren, O. R2 ....6.50
SparrowsPoint, Md. B2..6.60
Weirton, W.Va. W6 ....6.50
Yorkville, O. W10 ....6.50

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee, W.Va. F4 ...6.10
Gary, Ind. U5 ....6.10
GraniteCity, Ill. G4 ....6.30
Ind. Harbor, Ind. Y1 ....6.10
Irvin, Pa. U5 ....6.10
Yorkville, O. W10 ....6.10

MANUFACTURING TERNES (Special Coated)

Gary, Ind. U5 ....7.75
Irvin, Pa. U5 ....7.75
Yorkville, O. W10 ....7.75

MANUFACTURING TERNES (Light coated, 6 lb)

Yorkville, O. W10 ....8.65

ROOFING SHORT TERNES (8 lb Coated)

Gary, Ind. U5 ....9.75

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity, Ala. R2 ..5.75
Aliquippa, Pa. J5 ....5.75
Alton, Ill. L1 ....5.925
Atlanta A11 ....5.95
Bartonville, Ill. K4 ....5.85
Buffalo W12 ....5.75
Chicago W13 ....5.75
Cleveland A7, C20 ....5.75
Crawfordsville, Ind. M8..5.85
Donora, Pa. A7 ....5.75
Duluth, Minn. A7 ....5.75
Fairfield, Ala. T2 ....5.75
Fostoria, O. (24) S1 ....5.95
Houston S5 ....6.15
Jacksonville, Fla. M8 ....6.27
Joliet, Ill. A7 ....5.75
KansasCity, Mo. S5 ....6.35
Kokomo, Ind. C16 ....5.85
LosAngeles B3 ....6.70
Minnequa, Colo. C10 ....6.00
Monessen, Pa. P7 ....5.75
Newark, 6-8 ga. I-1 ....6.40
No. Tonawanda B11 ....5.75
Palmer, Mass. W12 ....6.05
Pittsburg, Calif. C11 ....6.70
Portsmouth, O. P12 ....5.75
Rankin, Pa. A7 ....5.75
So. Chicago, Ill. R2 ....5.75
So. SanFrancisco C10 ...6.70
SparrowsPoint, Md. B2..5.85
Sterling, Ill. (1) N15 ....5.75
Sterling, Ill. N15 ....5.85
Struthers, O. Y1 ....5.75
Waukegan, Ill. A7 ....5.75
Worcester, Mass. A7 ....6.05

WIRE, MB Spring, High Carbon

Aliquippa, Pa. J5 ....7.20
Alton, Ill. L1 ....7.375
Bartonville, Ill. K4 ....7.30
Buffalo W12 ....7.20
Cleveland A7 ....7.20
Donora, Pa. A7 ....7.20
Duluth, Minn. A7 ....7.20
Fostoria, O. S1 ....7.20
Johnstown, Pa. B2 ....7.20
LosAngeles B3 ....8.15
Millbury, Mass. (12) N6..7.50
Minnequa, Colo. C10 ....7.45
Monessen, Pa. P7, P16...7.20
Muncie, Ind. I-7 ....7.40
Palmer, Mass. W12 ....7.50
Pittsburg, Calif. C11 ....8.15
Portsmouth, O. P12 ....7.20
Roebling, N.J. R5 ....7.50
So. Chicago, Ill. R2 ....7.20
So. SanFran. C10 ....8.15
SparrowsPt., Md. B2 ...7.30
Struthers, O. Y1 ....7.20
Trenton, N.J. A7 ....7.50
Waukegan, Ill. A7 ....7.20
Worcester A7, J4, T6, W12 7.50

WIRE, Upholstery Spring

Aliquippa, Pa. J5 ....6.90
Alton, Ill. L1 ....7.075
Buffalo W12 ....6.90
Cleveland A7 ....6.90
Donora, Pa. A7 ....6.90
Duluth, Minn. A7 ....6.90
Johnstown, Pa. B2 ....6.90
KansasCity, Mo. S5 ....7.50
LosAngeles B3 ....7.85
Minnequa, Colo, C10 ...7.075
Monessen, Pa. P7, P16...6.90
NewHaven, Conn. A7 ...7.20
Palmer, Mass. W12 ....7.20
Pittsburg, Calif. C11 ...7.85
Portsmouth, O. P12 ....6.90
Roebling, N.J. R5 ....7.20
So. Chicago, Ill R2 ....6.90
So. SanFrancisco C10 ...7.85
SparrowsPoint, Md. B2..7.00
Trenton, N.J. A7 ....7.20
Waukegan, Ill. A7 ....6.90
Worcester, Mass. A7 ....7.20

WIRE, Fine & Weaving (8" Coils)

Alton, Ill. L1 ....11.375
Bartonville, Ill. K4 ....11.30
Buffalo W12 ....11.20
Chicago W13 ....10.55
Cleveland A7 ....11.20
Crawfordsville, Ind. M8..11.30
Fostoria, O. S1 ....11.20
Jacksonville, Fla. M8 ..11.73
Johnstown, Pa. B2 ....11.20
Kokomo, Ind. C16 ....11.20
Minnequa, Colo. C10 ...10.95
Monessen, Pa. P16 ....11.20
Muncie, Ind. I-7 ....11.40
Palmer, Mass. W12 ....11.50
Roebling, N.J. R5 ....11.50
So. SanFrancisco C10 ..11.55
Waukegan, Ill. A7 ....11.20
Worcester, Mass. A7, T6. 11.50

WIRE, Galv'd ACSR for Cores

Bartonville, Ill. K4 ....9.90
Buffalo W12 ....9.90
Johnstown, Pa. B2 ....9.90
Minnequa, Colo. C10 ..10.025
Monessen, Pa. P16 ....9.90
Muncie, Ind. I-7 ....10.10
Portsmouth, O. D2 ....9.90
Roebling, N.J. R5 ....10.20
SparrowsPt., Md. B2 ...10.00

ROPE WIRE (A)

Alton, Ill. L1 ....9.45
Bartonville, Ill. K4 ....9.35
Buffalo W12 ....9.35
Fostoria, O. S1 ....9.75
Johnstown, Pa. B2 ....9.75
Monessen, Pa. P7 ....9.35
Monessen, Pa. P16 ....9.75
Muncie, Ind. I-7 ....9.95
Palmer, Mass. W12 ....9.65
Portsmouth, O. P12 ....9.35
Roebling, N.J. R5 ....10.05
SparrowsPt. B2 ....9.85
Struthers, O. Y1 ....9.75
Worcester J4, T6 ....6.65

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE

(Continued)

WIRE, Tire Bead

Alton,Ill. L1	12.75
Bartonville,Ill. K4	13.25
Monessen,Pa. P16	13.15
Portsmouth,O. P12	13.15
Roebling,N.J. R5	13.45

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	7.95
Baltimore T6	8.25
Buffalo W12	7.95
Cleveland A7	7.95
Crawfordsville,Ind. M8	8.05
Dover,O. G6	7.95
Fostoria,O. S1	7.95
Kokomo,Ind. C16	8.05
FranklinPark,Ill T6	8.05
Massillon,O. R8	7.95
Milwaukee C23	8.15
Monessen,Pa. P7, P16	7.95
Pawtkt.,R.I. N8	8.25
Rome,N.Y.(32) R6	7.95
Trenton,N.J. R5	8.25
Worcester A7, T6, W12	8.25

WIRE, Merchant Quality

(6 to 8 gage)	An'ld. Galv.
Ala.City,Ala. R2	6.90 7.30**
Aliquippa J5	6.90 7.425‡
Atlanta A11	7.00 7.55
Bartonville(48) K4	7.00 7.55
Buffalo W12	6.90 7.30†
Cleveland A7	6.90 —
Crawfordsville M8	7.00 7.55
Donora,Pa. A7	6.90 7.30†
Duluth,Minn. A7	6.90 7.30†
Fairfield T2	6.90 7.30†
Houston,Tex. S5	7.30 7.70†
Jacks'ville,Fla. M8	7.425 7.95
JohnstownB2(48)	6.90 7.45*
Joliet,Ill. A7	6.90 7.30†
KansasCity,Mo. S5	7.50 7.90†
Kokomo C16	7.00 7.40†
LosAngeles B3	7.85 —
Minnequa C10	7.15 7.55**
Monessen P7 (48)	6.90 7.45
Palmer W12	7.20 7.60†
Pitts.,Calif. C11	7.85 8.25†
Portsmouth,O. P12	6.90 —
Rankin A7	6.90 7.30†
So.Chi'go R2	6.90 7.30**
S.S.Frn. C10	7.85 8.25**
Spar'wsPt.B2(48)	7.00 7.55*
Str'g(1)(48)N15	6.90 7.45
Struthers,O.(48)Y1	6.90 7.40‡
Worcester A7	7.20 —

* Based on 11c zinc; † 5c zinc; ‡ Less than 10c zinc; ** Subject to zinc equalization extras.

WOVEN FENCE, 9-15½Ga

	Col.
Ala.City,Ala.R2	146**
Ala.City, 17 ga. R2	241**
Ala.City, 18 ga. R2	251**
Aliq'ppa,Pa.9-14½ga.J5	149‡
Atlanta A11	151
Bartonville,Ill. K4	151
Crawfordsville,Ind. M8	151
Donora,Pa. A7	146†
Duluth,Minn. A7	146†
Fairfield,Ala T2	146†
Houston,Tex. S5	154†
Johnstown,Pa.(43) B2	149
Joliet,Ill. A7	146†
KansasCity,Mo. S5	158†
Kokomo,Ind. C16	148†
Minnequa,Colo. C10	154**
Monessen,Pa. 9 ga. P17	151
Pittsburg,Calif. C11	169†
Rankin,Pa. A7	146†
So.Chicago,Ill. R2	146**
Sterling,Ill.(1) N15	149

† Based on 5c zinc; * 11c zinc; ‡ 10c zinc; ** Subject to zinc equalization extras.

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	155
Atlanta A11	157
Bartonville,Ill. K4	157
Crawfordsville,Ind. M8	157
Donora,Pa. A7	155
Duluth,Minn. A7	155
Fairfield,Ala. T2	155
Joliet,Ill. A7	155
Houston S5	163
KansasCity,Mo. S5	167
Kokomo,Ind. C16	157
Minnequa,Colo. C10	160
Pittsburg,Calif. C11	179
So.Chicago,Ill. R2	155
So.SanFran.,Calif. C10	179
SparrowsPoint,Md. B2	157
Sterling,Ill.(1) N15	155

WIRE, Barbed

	Col.
Alabama,City,Ala. R2	159**
Aliquippa J5	156‡
Atlanta A11	164
Bartonville,Ill. K4	164
Crawfordsville,Ind. M8	164
Donora,Pa. A7	159†
Duluth,Minn. A7	159†
Fairfield,Ala. T2	159†
Houston,Tex. S5	167†
Johnstown,Pa. B2	162*
Joliet,Ill. A7	159†
KansasCity,Mo S5	171†
Kokomo,Ind. C16	161†
Minnequa,Colo. C10	165**
Monessen,Pa. P7	163
Pittsburg,Calif. C11	179†
Rankin,Pa. A7	159†
So.Chicago,Ill. R2	159**
S.SanFrancisco C10	179**
SparrowsPoint,Md. B2	164*
Sterling,Ill.(1) N15	162

† Based on 5c zinc; * 11c zinc; § 10c zinc; **Subject to zinc equalization extras.

WIRE (16 gage)

	An'ld. Stone	Galv. Stone
Ala.City R2	13.15	14.70**
Aliquippa J5	12.50	14.30‡
Bartonville K4	13.25	15.10
Buffalo W12	13.15	—
Cleveland A7	13.15	—
CrawfordsvilleM8	13.25	15.10
Fostoria,O. S1	13.25	14.80†
Johnstown B2	13.15	15.00*
Kokomo C16	12.60	14.15†
Minnequa C10	13.40	15.10**
Palmer,Mas.W12	13.15	14.70*
Pitts.,Calif. C11	13.50	15.05†
So.Chicago R2	13.15	14.70
SparrowsPt. B2	13.25	15.10*
Sterling(1) N15	13.15	15.00
Waukegan A7	13.15	14.70†
Worcester A7	13.45	—

* Based on 11c zinc; † 5c zinc; § 10c zinc; ** Subject to zinc equalization extras.

NAILS, Stock

To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	137
Aliquippa,Pa. J5	137
Atlanta A11	139
Bartonville,Ill. K4	139
Chicago,Ill. W13	137
Cleveland A9	142
Crawfordsville,Ind. M8	139
Donora,Pa. A7	137
Duluth,Minn. A7	137
Fairfield,Ala. T2	137
Galveston,Tex. D7	139
Houston,Tex. S5	145
Johnstown,Pa. B2	137
Joliet,Ill. A7	137
KansasCity, Mo. S5	149
Kokomo,Ind. C16	139
Minnequa,Colo. C10	142
Monessen,Pa. P7	137
Pittsburg,Calif. C11	156
Rankin,Pa. A7	137
So.Chicago,Ill. R2	137
SparrowsPt., Md. B2	139
Sterling,Ill.(1) N15	137
Worcester,Mass. A7	143

NAILS, CUT (100 lb keg)

To dealers (33)	
Conshohocken,Pa. A3	$8.30
Wheeling,W.Va. W10	8.30

STAPLES, Polished Stock

To dealers & mfrs. (7)	Col.
AlamabaCity,Ala. R2	138
Aliquippa,Pa. J5	138
Atlanta A11	140
Bartonville,Ill. K4	140
Crawfordsville,Ind. M8	140
Donora,Pa. A7	138
Duluth,Minn. A7	138
Fairfield,Ala T2	138
Johnstown,Pa. B2	138
Joliet,Ill. A7	138
Kokomo,Ind. C16	140
Minnequa,Colo. C10	143
Monessen,Pa. P7	138
Pittsburg,Calif. C11	157
Rankin,Pa. A7	138
So.Chicago,Ill. R2	138
SparrowsPt. Md. B2	140
Sterling,Ill.(1) N15	138
Worcester,Mass. A7	144

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2, I-2.	150
Duluth,Minn. A7	150
Franklin,Pa. F5	150
Johnstown,Pa. B2	145
Marion,O. P11	145
Minnequa,Colo. C10	155
Moline,Ill. R2	155
So.Chicago,Ill. R2	150
Tonawanda,N.Y. B12	150
Williamsport,Pa. S19	150

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants, per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam.	4
⅝-in. & ¾-in.	5
⅞-in. and larger	3
Longer than 6 in.:	
All diameters	+4
Lag bolts, all diams.:	
6 in. and shorter	12
Over 6 in. long	8
Ribbed Necked Carriage	5
Blank	25
Plow	25
Step, Elevator, Tap and Sleigh Shoes	12
Tire Bolts	List
Boiler & Fitting-Up Bolts	23

NUTS

H.P. and C.P., regular & heavy:	
Square, all sizes	58
H.P., Hex, regular & heavy:	
¾" and smaller	58
⅞" to 1⅛", inclusive.	60
1¼" to 1½", inclusive	62
1⅝" and larger	58
C.P. Hex regular & heavy:	
All sizes	58
Hot Galv. Nuts (all types):	
¾" to 1⅛", inclusive.	40
⅞" to 1½", inclusive.	43
Finished Hex Nuts:	
New standard, all sizes	58
Semifinished & Slotted Hex:	
Regular and heavy, all sizes	58

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	34
1 in. and smaller diam. x over 6 in.	20

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	34
¼ in. diam & larger	14
N.F. thread, all diams.	8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish	47.5—10
Plated finishes	30—10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
⅝-in. & smaller	38
¾-in. through 1 in.	22
Longer than 6 in.:	
⅝-in. and smaller	20
¾-in. through 1 in.	7

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.25
⅞-in. under..List less 37%

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D.	B.W.	Seamless		Elec. Weld
In.	Gage	H.R.	C.D.	H.R.
1	13	....	19.59	19.00
1¼	13	....	23.21	18.77
1½	13	21.40	25.65	20.75
1¾	13	25.28	30.31	24.52
2	13	28.33	33.97	27.48
2¼	13	31.91	38.26	30.96
2½	12	34.63	41.52	33.59
2¾	12	38.15	45.74	37.00
2¾	12	41.31	49.53	40.07
3	12	44.06	52.82	42.72

RAILWAY MATERIALS

	Std. No. 1	Std. No. 2	All No. 2	Std. Toe Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	4.45	4.35	4.40	5.35
Ensley,Ala. T2	4.45	4.35	....	5.35
Fairfield,Ala. T2	....	....	....	5.35
Gary,Ind. U5	4.45	4.35	4.40	....
Huntington,W.Va. W7	....	....	....	5.35
IndianaHarbor,Ind. I-2	4.45	4.35	4.40	....
Johnstown,Pa. B2	....	....	...(16)	5.35
Lackawanna,N.Y. B2	4.45	4.35	....	5.35
Minnequa,Colo. C10	4.45	4.35	....	5.35
Steelton,Pa. B2	4.45	4.35	....	5.35
Williamsport,Pa. S19	....	....	....	5.35

TIE PLATES

Fairfield,Ala. T2	5.275
Gary,Ind. U5	5.275
Ind.Harbor,Ind. I-2	5.275
Lackawanna,N.Y. B2	5.275
Minnequa,Colo. C10	5.275
Seattle B3	5.425
Steelton,Pa. B2	5.275
Torrance,Calif. C11	5.425

TRACK BOLTS (20) Treated

Cleveland R2	11.50
KansasCity,Mo. S5	11.50
Lebanon,Pa. B2	11.50
Minnequa,Colo. C10	11.50
Pittsburgh O3	11.50
Pittsburgh P14	11.50
Seattle,Wash. B3	12.00

AXLES

Ind.Harbor,Ind. S13	6.75
Johnstown,Pa. B2	6.75

JOINT BARS

Bessemer,Pa. U5	5.425
Fairfield,Ala. T2	5.425
Ind.Harbor,Ind. I-2, Y1	7.30
Joliet,Ill. U5	5.425
Lackawanna,N.Y. B2	5.425
Minnequa,Colo. C10	5.425
Steelton,Pa. B2	5.425

SCREW SPIKES

Cleveland R2	11.00

STANDARD TRACK SPIKES

Fairfield,Ala. T2	7.30
Ind.Harbor,Ind. I-2, Y1	7.30
KansasCity,Mo. S5	7.30
Lebanon,Pa. B2	7.30
Minnequa,Colo. C10	7.30
Pittsburgh J5	7.30
Seattle B3	7.80
So.Chicago,Ill. R2	7.30
Struthers,O. Y1	7.30
Youngstown R2	7.30

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

Sponge iron:	Cents
98+% Fe, annealed	18.00
Unannealed	
Minus 100 mesh	14.50
Minus 35 mesh	10.25
Minus 20 mesh	10.00
Swedish, c.l.f. N.Y., c.l., in bags	11.25
Domestic (Swedish), f.o.b. Riverton, N. J., in bags	11.25
Electrolytic iron:	
Melting stock, 99.91% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe	36.50
Unannealed (99+% Fe)	32.50
Unannealed (99+% Fe) (minus 325 mesh)	52.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron:	
97.9-99.8% size 5 to 10 microns	83.00-148.00
Aluminum:	
Atomized, 500 lb drums, frgt. allowed:	
Carlots	32.00
Ton lots	34.00
Antimony, 500 lb lots	32.00*
Brass, ¼-ton lots	28.75-37.50†
Bronze, ¼-ton lots	31.00-39.00†
Copper:	
Electrolytic	13.50*
Reduced	13.50*
Lead	7.50*
Manganese:	
Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed	89.50
Nickel-Silver, ¼-ton lots	45.75‡
Nickel-Silver, ¼-ton lots	48.50**
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	43.50
Solder	8.50*
Stainless Steel, 302	91.00
Tin	14.50*
Zinc, ¼-ton lots	18.25-32.00†
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	4.95
Less than 1000 lb	5.10
Chromium electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni; **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flat, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼" to 1 7/16"; 1 7/16" to 1 15/16" 4.75c; 1 15/16" to 7 5/16" 5.15c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.30c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 24" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 4.95c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon and 0.35c H.S.-L.A.
(31) Base; deld. within mill county.
(32) Buffalo base.
(33) To jobbers, deduct 30c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 gage & heavier; 60" & narrower.
(38) 14 gage & lighter.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. to mill some or within switching limits, 5.10c.
(43) 9-14½ gage.
(48) 6-7 gage.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	13.5	list	17.5	0.25	20	2.75	21.5	4.25	21.5	4.25	20.75	3.5	23.25	6
Ambridge, Pa. N2 (†)	13.5	...	17.5	...	20	...	21.5	...	21.5	...	20.75	...	23.25	...
Lorain, O. N3 (*)	13.5	2.25	17.5	3.25	20	5.75	21.5	7.25	21.5	7.25	20.75	6.5	23.25	9
Youngstown Y1 (††)	13.5	+1.5	17.5	0.75	20	3.25	21.5	4.75	21.5	4.75	20.75	4	23.25	6.5

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2 (**)	13.5	1.5	17.5	0.75	20	3.25	21.5	4.75	21.5	4.75	20.75	4	23.25	6.5

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	...	...	....	....	....	....	23.75	7.5	26.75	11.5	29.25	15	31.75	16
Alton, Ill. L1 ($)	...	...	....	....	....	....	21.75	6.5	24.75	10.5	27.25	14	29.75	14.75
Benwood, W. Va. W10(††)	24	+2.5	15.25	+8.25	7.25	+14.25	23.75	8.5	26.75	12.5	29.25	16	31.75	16.75
Butler, Pa. F6‡‡	25	+1.5	17	+6.5	9.5	+12	....	..	....	...	....	..	....	....
Etna, Pa. N2 (†)	...	...	....	....	....	....	23.75	8.5	26.75	12.5	29.25	16	31.75	16.75
Fairless, Pa. N3	...	...	....	....	....	....	19.25	..	22.25	...	24.75	..	27.25	....
Fontana, Calif. K1 ($)	...	...	....	....	....	....	10.75	+4.5	13.75	+0.5	16.25	3	18.75	3.75
Ind. Harbor Y1 (††)	...	...	....	....	....	....	22.75	7.5	25.75	11.5	28.25	15	30.75	15.75
Lorain, O. N3 (*)	...	...	....	....	....	....	23.75	13.5	26.75	17.5	29.25	21	31.75	20.5
Sharon, Pa. S4 (‡)	25	+1.5	17	+6.5	9.5	+12	....	..	....	...	....	..	....	....
Sharon, Pa. M6	...	...	....	....	....	....	23.75	8.5	26.75	12.5	29.25	16	31.75	16.75
Sparrows Pt., Md. B2 ($)	23	+3.5	15	+8.5	7.5	+14	31.75	6.5	24.75	10.5	27.25	13	29.75	14
Youngstown R2 (**)	...	...	....	....	....	....	23.75	8.5	26.75	12.5	29.25	16	31.75	16.75
Youngstown Y1 (††)	...	...	....	....	....	....	23.75	8.5	26.75	12.5	29.25	16	31.75	16.75
Wheatland, Pa. W9 ($)	23	+3.5	15	+8.5	7.5	+14	23.75	8.5	26.75	12.5	29.25	16	31.75	16.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	32.25	17	32.75	17.5	34.25	17.5	34.25	17.5	....	...	....	...
Alton, Ill. L1 ($)	30.25	15.75	30.75	16.25	32.25	16	32.25	16	23.25	6.75	23.25	6.75
Benwood, W. Va. W10(††)	32.25	17.75	32.75	18.25	34.25	18	34.25	18	25.5	8.75	25.5	8.75
Etna, Pa. N2 (†)	32.25	17.75	32.75	18.25	34.25	19	34.25	19	25.5	8.75	25.5	8.75
Fairless, Pa. N3	27.75	....	28.25	....	29.75	...	29.75	...	21	...	21	...
Fontana, Calif. K1 ($)	19.25	4.75	19.75	5.25	21.25	5	21.25	5	12.5	+4.25	12.5	+4.25
Ind. Harbor, Ind. Y1 (††)	31.25	16.75	31.75	17.25	33.25	17	33.25	17	....	...	....	...
Lorain, O. N3 (*)	32.25	21.5	32.75	22	34.25	20.5	34.25	20.5	....	...	....	...
Sharon, Pa. M6	32.25	17.75	32.75	18.25	34.25	18	34.25	18	....	...	....	...
Sparrows Pt., Md. B2 ($)	30.25	16	29.75	15.5	32.25	15.5	32.25	15.5	23.5	6.25	23.5	6.25
Youngstown R2 (**)	32.25	17.75	32.75	18.25	34.25	18	34.25	18	25.5	8.75	25.5	8.75
Youngstown Y1 (††)	32.25	17.75	32.75	18.25	34.25	18	34.25	18	....	...	....	...
Wheatland, Pa. W9 (‡)	32.25	17.75	32.75	18.25	34.25	18	34.25	18	....	...	....	...

Galvanized pipe discounts based on zinc price of: (†), 14c; (‡), 11c to under 12c; (*), 5c; ($), over 9c to 11c inclusive; (††), 10.50c-11.50c; (**), 9.50c; with discounts adjusted on price of zinc at time of shipment; (‡‡), 11c.

Stainless Steel

(Representative prices, cents per pound; subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	H.R. Strip	Shapes; H.R. & C.F. Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.25	20.50	29.50	34.25	29.75	35.25	37.25	41.25	38.25
302	17.25	22.75	29.75	34.50	32.00	35.50	37.50	41.50	41.50
302B	18.50	24.50	30.50	34.50	35.00	35.50	37.50	44.75	44.75
303	18.75	24.75	32.25	37.25	36.75	38.25	39.75	48.75	45.50
304	18.25	23.75	31.00	36.00	34.25	37.25	39.75	43.75	43.75
304L	....	....	36.75	....	....	42.75	45.25	49.00	49.00
306	19.50	25.50	....	36.25	37.00	37.50	42.00	51.75	46.75
308	19.75	26.25	35.25	40.75	38.00	42.00	46.00	48.00	48.00
309	26.50	34.75	43.25	49.25	49.25	50.50	53.75	62.00	62.00
309S	28.50	37.50	47.50	54.50	54.00	55.50	59.00	68.50	68.50
310	33.00	43.25	56.75	66.25	62.75	67.50	69.00	72.25	72.25
314	....	....	....	....	....	....	69.00	74.50	....
316	28.00	36.25	46.75	54.50	53.25	55.60	59.00	62.75	62.75
316L	....	....	52.50	....	58.25	61.00	64.25	67.75	67.75
317	33.00	43.50	58.25	66.75	67.50	68.25	70.75	77.00	77.00
318	33.50	44.00	55.25	64.50	66.25	65.50	68.75	80.25	80.25
321	22.75	29.50	35.25	40.75	41.00	42.00	46.00	50.50	50.50
330	....	....	58.00	....	....	68.50	70.00	73.75	77.75
347	24.50	32.25	39.50	45.75	46.50	46.75	51.25	59.25	59.25
403	....	....	27.00	30.75	....	32.00	34.25	44.00	41.25
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	39.75	39.75
410	14.00	18.25	24.00	27.75	26.25	28.75	30.00	34.25	34.25
416	....	....	24.50	28.25	....	29.25	30.50	41.25	41.25
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	52.75	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	34.75	34.75
430F	....	18.75	25.00	28.75	....	29.75	31.00	44.00	44.00
431	14.50	28.50	25.00	28.25	27.50	29.25	30.50	35.25	35.25
440A,B,C	....	28.50	29.25	34.00	....	35.00	38.50	49.25	52.75
442	....	....	28.00	....	....	30.50	35.25	48.25	47.75
446	....	....	33.75	38.25	50.25	39.50	40.75	50.75	59.75
501	....	....	14.00	14.50	21.25	16.00	18.25	29.00	29.00
502	....	....	15.25	16.00	22.25	17.00	20.00	30.00	30.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co., Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co., Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

Cladding / Stainless	Plates: Carbon Base 10%	Plates: Carbon Base 20%	Sheets: Carbon Base 20%	Sheets: Copper Base Both Sides
302	....	31.00	31.00	77.00
304	27.60-28.10	32.50-32.70	32.50	77.00
310	36.50	41.00	....	144.00
316	32.60-33.10	37.70-42.75	42.75	....
318	37.00-37.50	42.20-42.70	....	....
321	29.36-29.80	34.40-37.00	37.00	111.00
347	30.40-30.90	35.50-40.50	40.50	130.00
405	23.40-23.90	30.60-31.10	....	....
410	22.90-23.40	30.10-30.60	....	....
430	23.40	30.60	....	....
Inconel	46.90	61.90	....	165.00
Nickel	38.30	51.70	....	....
Monel	39.70	52.66	....	....
Copper*	....	....	46.00	....

	Strip, Carbon Base: Cold-Rolled 10%	Cold-Rolled Both Sides	Hot-Rolled 10%	Hot-Rolled Both Sides
Copper*	28.85	35.85	25.00	32.25

* Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; Copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie, Pa. A13.

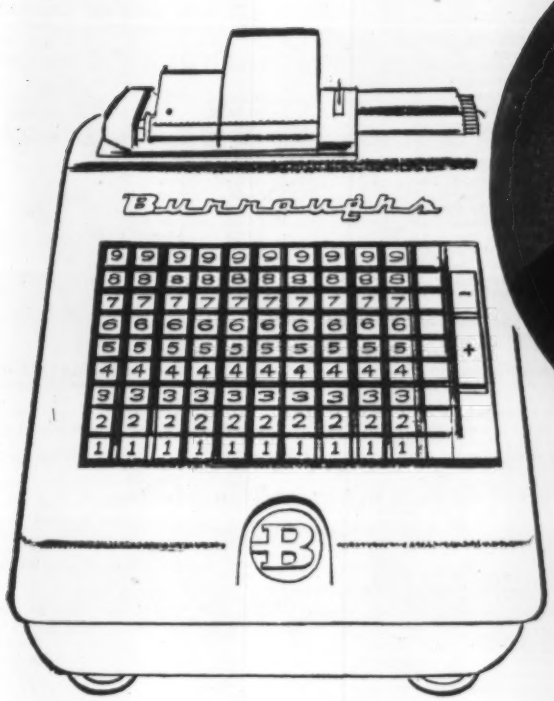
Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.26	5% Cr Hot Work	0.405
Extra Carbon	0.31-.315	W-Cr Hot Work	0.425
Special Carbon	0.37	V-Cr Hot Work	0.445
Oil Hardening	0.405	Hi-Carbon-Cr	0.73

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.030
19	4	2	12	...	3.990
18.25	4.25	1	4.75	...	2.245-2.415
18	4	2	9	...	2.615
18	4	2	....	...	1.705
18	4	1	....	...	1.540
18	4	1	5	...	2.250
14	4	2	5	...	2.185
13.75	3.75	2	5	...	2.185
13.5	4	3	....	...	1.805
9	3.5	..	....	...	1.115
6	4	2	....	5	1.045
6	4	3	....	6	1.290
1.5	4	1	....	8.5	0.990

Tool Steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.



J. S. Coleman, President
Burroughs Corporation

"Business Publications are essential tools of management"

"To keep abreast of rapidly developing techniques in all areas of business operations," says Mr. Coleman, "is not an easy task. Yet, if management is to discharge the responsibilities laid upon it, it must be informed both of technical developments and, indeed, of events and trends of the nation as a whole."

"Without business publications," Mr. Coleman adds, "the job would be impossible. As the size and complexity of the job have grown, management has come to depend increasingly on business publications for information necessary to sound judgment."

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The national association of publishers of 165 technical, professional, scientific, industrial, merchandising and marketing magazines, having a combined circulation of 3,849,056... audited by either the Audit Bureau of Circulations or Business Publications Audit of Circulation, Inc.... serving and promoting the Business Press of America... bringing thousands of pages of specialized know-how and advertising to the men who make decisions in the businesses, industries, sciences and professions... pin-pointing your audience in the market of your choice. Write for list of NBP publications and the latest "Here's How" booklet, "How We Use the Business Press and Why" by William C. Sproull, Director of Advertising of the Burroughs Corp., Detroit.

STEEL is an active member of NBP

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	52.38	52.88	....	....
Birmingham U5	....	52.88	56.50†	....
Gadsden, Ala. R2	52.38	52.88	....	....
Woodward, Ala. W15	52.38	52.88	56.50†	....
Cincinnati, del.	....	60.43	....	....
Buffalo District				
Buffalo R2, H1	56.00	56.50	57.00	....
Tonawanda, N.Y. W12	56.00	56.50	57.00	....
No. Tonawanda, N.Y. T9	....	56.50	57.00	57.50
Boston, del.	66.65	67.15	67.65	....
Rochester, N.Y., del.	59.02	59.52	60.02	....
Syracuse, N.Y., del.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Chicago R2	56.00	....	56.50	....
Gary, Ind. U5	56.00	....	56.50	....
Indiana Harbor, Ind. I-2	56.00	....	56.50	....
So. Chicago, Ill. W14, Y1	56.00	56.50	56.50	....
So. Chicago, Ill. U5	56.00	....	56.50	57.00
Milwaukee, del.	58.17	58.67	58.67	59.17
Muskegon, Mich., del.	....	62.80	62.80	....
Cleveland District				
Cleveland A7	56.00	56.50	56.50	57.00
Cleveland R2	56.00	56.50	56.50	....
Akron, O., del. from Cleve.	58.75	59.25	59.25	59.75
Lorain, O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem, Pa. B2	58.00	58.50	59.00	59.50
New York, del.	....	62.28	62.78	....
Newark, del.	61.02	61.52	62.02	62.52
Birdsboro, Pa. B10	58.00	58.50	....	....
Chester, Pa. C31	48.00	48.50	49.00	....
Philadelphia, del.	49.66	50.16	50.66	....
Steelton, Pa. B2	58.00	58.50	59.00	59.50
Swedeland, Pa. A3	58.00	58.50	59.00	59.50
Troy, N.Y. R2	58.00	58.50	59.00	....
Pittsburgh District				
Neville Island, Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Ambridge, Aliquippa, del.	57.37	57.87	57.87	58.37
McKees Rocks, del.	57.04	57.54	57.54	58.04
Lawrenceville, Homestead, Wilmerding, Monaca, del.	57.66	58.16	58.16	58.66
Verona, Trafford, del.	58.19	58.69	58.69	59.19
Brackenridge, del.	58.45	58.95	58.95	59.45
Bessemer, Pa. U5	56.00	....	56.50	57.00
Clairton, Rankin, So. Duquesne, Pa. U5	56.00	....	....	....
McKeesport, Pa. N3	56.00	....	....	57.00
Midland, Pa. C18	56.00	....	....	....
Monessen, Pa. P7	56.00	....	....	....

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Youngstown District				
Hubbard, O. Y1	....	....	56.50	....
Sharpsville, Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield, O., del.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie, Pa. I-3	56.00	56.50	56.50	57.00
Everett, Mass. E1	60.50	61.00	61.50	....
Fontana, Calif. K1	62.00	62.50	....	....
Geneva, Utah C11	56.00	56.50	....	....
Granite City, Ill. G4	57.90	58.40	58.90	....
Ironton, Utah C11	56.00	56.50	....	....
Lone Star, Texas L6	52.00	52.50*	52.50	....
Minnequa, Colo. C10	58.00	59.00	59.00	....
Rockwood, Tenn. T2	....	52.50*	56.50	....
Toledo, O. I-3	56.00	56.50	56.50	57.00
Cincinnati, del.	61.76	62.26	....	....

* Low phos. southern grade. † Phos., 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.00 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson, O. G2, J1	$65.00
Buffalo H1	66.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Niagara Falls, N.Y. P15	$80.50
Keokuk, Iowa, Openhearth & Fdry, freight allowed K2	85.00
Keokuk, OH & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	88.00
Wenatchee, Wash. OH & Fdry, freight allowed K2	85.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate A7	$61.60
Rockwood, Tenn. T3	70.00
Steelton, Pa. B2	64.00
Philadelphia, del.	67.55
Troy, N.Y. R2	64.00

Warehouse Steel Products

Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except Birmingham, St. Paul, 15 cents; Boston, Philadelphia, New York, 10 cents; Seattle and Spokane, Wash., no charge; at Buffalo and Philadelphia, on cold-finished bars and sheets, alloy bars and galvanized sheets, 25 cents.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	Stainless Type 302‡‡	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.§	H.R. Alloy 4140††‡		Carbon	Floor
Baltimore	6.22	7.51	7.77	....	6.89	...	6.88	8.52[6]	12.04	6.92	6.57	7.96**
Birmingham	6.35	7.35	8.25[2]	....	6.60	...	6.50	9.10	....	6.65	6.65	8.45
Boston	7.23	8.23	9.52	44.78[9]	7.47	...	7.20	8.60	12.45	7.49	7.37	8.50
Buffalo	6.35	7.40	8.79	....	6.70	...	6.50	7.85	12.15	6.77	6.70	7.80
Carnegie, Pa.	6.38	...	8.30	....	6.72	...	6.51	7.85	12.15	6.72	6.65	6.90
Charlotte, N. C.	6.95	7.80	8.69	....	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.38	7.38	8.30	45.55	6.62	...	6.51	7.50	11.90	6.69	6.52	7.64
Cincinnati	6.49	7.37	8.25	45.80	6.86	...	6.75	7.80	12.15	6.86	6.81	7.89
Cleveland	6.38	7.38	8.45	45.66	6.72	...	6.57	7.60	11.96	7.02	6.69	7.81
Detroit	6.57	7.57	8.58	43.50	6.90	7.36	6.79	7.79	12.10	7.16	6.80	7.83
Erie, Pa.	6.35	7.38	8.30	....	6.70	...	6.50	7.45[4]	....	6.69	6.52	7.64
Houston	7.35	7.80	9.93	....	7.70	9.30	7.70	9.50	....	7.35	7.35	8.75
Los Angeles	7.40	9.25	9.80	50.15	7.75	11.75	7.35	10.05	13.20	7.55	7.35	9.45
Milwaukee	6.47	7.47	8.39	....	6.71	...	6.60	7.69	11.99	6.86	6.61	7.73
Moline, Ill.	6.73	7.73	8.65	....	6.97	...	6.86	7.85	....	6.81	6.87	...
New York	6.97	7.91	8.79	44.45	7.56	...	7.37	8.73[6]	10.53	7.38	7.27	8.68
Norfolk, Va.	7.00	...	...	....	7.10	...	7.10	8.60	....	7.10	7.10	7.95
Philadelphia	6.19	7.29	8.08	41.98[9]	6.96	8.80	6.74	8.19[6]	11.96	6.54	6.49	7.51**
Pittsburgh	6.38	7.38	8.30	45.50	6.72	...	6.51	7.85	11.90	6.69	6.52	7.64**
Portland, Oreg.	7.60	8.75	9.70	48.50	7.85	...	7.55	10.95	14.00	7.50	7.45	9.35
Richmond, Va.	6.43	7.39	8.67	....	6.77	...	6.71	8.33	....	7.08	6.65	8.08
St. Louis	6.67	7.67	8.59	43.89	6.91	...	6.80	7.89	12.19	7.09	6.81	7.93
St. Paul	7.03	8.03	8.96	....	7.28	...	7.16	8.26	....	7.12	7.19	8.30
San Francisco	7.55	8.95	9.35	48.15	7.80	...	7.35	10.05	13.20	7.50	7.40	9.45
Seattle	8.10	9.80	10.15	50.50	8.20	...	7.80	10.95	13.65	7.75	7.80	9.60
Spokane	8.35	9.65[7]	10.05	....	8.30	...	7.80	10.85[8]	14.40	7.45	7.55	9.60
Washington	6.70	7.99	7.97	....	7.37	...	7.38	9.09	....	7.31	7.05	8.16

*Prices do not include gage extras; †prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extras excluded); ‡includes 35-cent special bar quality extra; §as rolled; **¼-in. and heavier; ††as annealed; ‡‡prices include $2 for crating; Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over, except in Seattle where base is 2000 to 9999 lb; stainless sheets, 8000 lb except in New York and Boston where base is 10,000 lb. [2]—500 to 9999 lb; [4]—4000 lb and over; [6]—1000 to 1999 lbs; [8]—1000 lb and over; [7]—1500 lb to 3999; [9]—under ½ in.; [9]—f.o.b. local delivery in lots of 10,000 lb and over.

LITCHFIELD PRODUCTS COMPANY

NOW ROLL WASHING MACHINE WORM GEARS

This washing machine worm gear is rolled from STRESSPROOF by LITCHFIELD PRODUCTS CO., Litchfield, Mich.

STRESSPROOF®

SEVERELY COLD-WORKED, FURNACE-TREATED STEEL BARS

. . . CUT COSTS 40%

For years, STRESSPROOF has been recognized as an ideal worm gear steel. Several washing machine worm gears have been particularly successful. STRESSPROOF worms *outwear* the washing machine. STRESSPROOF's *ease of machinability* and *elimination of heat treating* keep costs down.

Now, the Litchfield Products Company, Litchfield, Michigan, roll the worm on this part for one of the largest washing machine manufacturers. The savings of 40% on the part cost is evident. Lead and pitch diameter requirements are maintained.

And there is no question as to gear life. STRESSPROOF's rugged wearability takes care of that whether the gear be cut or rolled.

STRESSPROOF makes a better part at lower cost. It's available in cold-drawn or ground and polished finish.

ASK FOR . . . your copy of this bulletin, "New Economies in the Use of Steel Bars."

La Salle **STEEL CO.**

Manufacturers of the Most Complete Line of Cold-Finished Carbon and Alloy Steel Bars in America

La SALLE STEEL COMPANY
1414 150th Street
Hammond, Indiana

Please send me your new bulletin entitled, "New Economies in the Use of Steel Bars."

Name_____

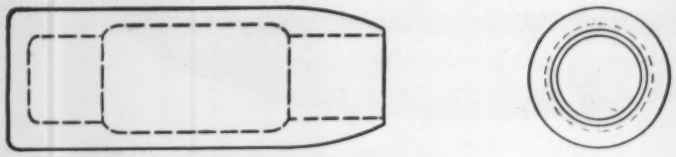
Title_____

Company_____

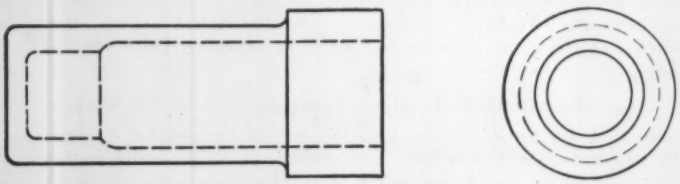
Address_____

City_____ Zone___ State_____

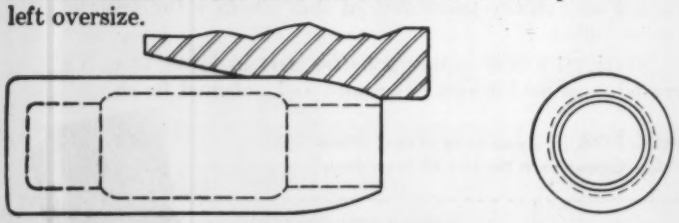
Shaping inside chamber...simplifies machining



This finished piece with its specially shaped inside diameter presented a problem until Torrington's swaging experts were called in.



They suggested starting with this drilled, reamed and formed blank. Notice that the material at the open end is left oversize.



One swaging operation in dies designed for the job shaped the inside chamber as well as the outside to the desired contour.

Look at these Swaging Economies

1. Swaging is fast—it is ideally suited to mass production of special shapes.

2. Swaging is easy—it can be performed by unskilled labor.

3. Swaging is efficient—it utilizes nearly all the material without waste.

4. Swaging is inexpensive—it eliminates many costly screw machine operations, while giving metal better finish and resiliency.

For more information on swaging as a method for shaping or reducing metals, write for our informative booklet. It describes in detail the Torrington Rotary Swagers that may be able to help you write a "swaging success story" in your own plant.

THE TORRINGTON COMPANY
Swager Department
150 North Street, Torrington, Conn.
Makers of Torrington Needle Bearings

TORRINGTON ROTARY SWAGING MACHINES

Construction industry helps bolt makers recover as . . .

High-Strength Bolts Gain Strength

HIGH-STRENGTH BOLTS are doing their share to hold the bolt and nut industry together. And as their use becomes more firmly established in construction, they will give greater strength to an industry that was one of the first to feel the pinch in the "rolling adjustment" period.

There are few absolute statistics on market performance and potential. This segment of the industry is too new. High-strength bolts as such have been used for some time in the heavy equipment field. About eight years ago, the Engineering Foundation set up the Research Council on Riveted and Bolted Structural Joints to study both types of construction. In 1951, it adopted specifications for assembly of bolted joints, using quenched and tempered bolts covered by American Society for Testing Materials specification A-325. Since then, high-strength bolts have been an important factor in the construction and bolt and nut industries.

Variety—It is impossible to keep track of the number of bolted structures, but American Institute of Steel Construction compiles a list periodically of major projects. A recent list of 47 structures included almost everything from hospitals and schools to steel mills. Probably the largest single bolted structure to date is the Atomic Energy Commission's project in southern Ohio. This plant will consume about 1.5 million bolts.

Industrial Fasteners Institue estimates that an average of 25 fasteners goes into every ton of field-erected steel. Over the long haul, there are between 2.5 million and 3 million tons erected each year. That's between 62.5 million and 75 million fasteners a year. Average cost of high-strength bolts is about 3 for $1, or about $8 for each ton of field-erected steel. That comes to a tidy potential market between $20 million and $32 million a year.

Riveters Need Not Fear—But the bolt will probably never completely replace the rivet. Practically all shop fabrication of structural steel is riveted. In the field the story is different. For instance, all 87 bridges along the Maine turnpike extension are being bolted. The cost per ton of erected steel was between $10 and $20 cheaper for this type construction, according to contractors' bids.

Good Performer—On several structures not a single bolt has been retightened, much less replaced, for over four years. As a result of such high performance, the Research Council has revised its specifications for applying high-strength bolts to allow for even greater economies.

Several large bolt and nut makers are placing great faith in this new business. Bethlehem Steel Co., Pittsburgh Screw & Bolt Corp., and Russell, Burdsall & Ward Bolt & Nut Co. were represented in the pioneer work of the Research Council. At present, about a baker's dozen are either actively producing or have shown an interest in the business. One large bolt maker, who has been in the high-strength business only a short time and on a limited basis, has so much confidence in its future that it is building up a full inventory of all popular sizes. Being a short delivery product, a large inventory is required if the business is to be successful.

Too Much Capital—Because a great deal of capital is wrapped up in bolt-making machines, heat-treating equipment and large inventories, not many more producers are expected to enter the field. Most producers agree there is sufficient capacity for near-future demand. But with the gradual removal of code restrictions on bolted structures and with the wider acceptance of the method among design engineers and construction people, the market for high-strength bolts will realize more of its potential.

Stainless Steel . . .

Stainless Steel Prices, Page 186

Two of three major auto producers stepped up stainless steel orders in the Pittsburgh area last week. After slow July and August sales, producers report the auto orders were the largest received in four months.

Sheets, Strip . . .

Sheet Prices, Pages 183 & 184

Post-Labor-Day pickup in sheet and strip demand appears to be developing. Buying lacks vigor but it is definitely improved, including automotive ordering. Deliveries are slightly more extended.

Producers are encouraged by the slight improvement in sales. They expect this trend to continue. A Chicago district producer extended its rolling schedule on cold-rolled sheets and strip and enameling sheets to seven weeks. It had been five to six weeks. In that area auto builders are reported placing orders for October-November shipment.

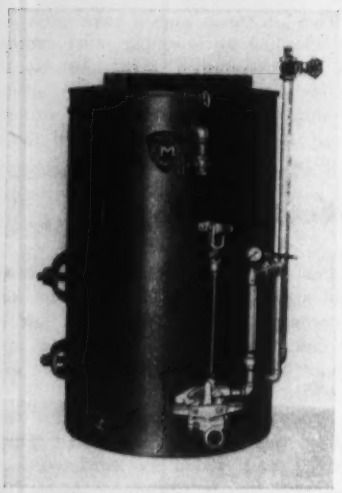
Generally, automotive buying is expected to spurt late this month. Current auto orders for cold-rolled sheets are described by one Pittsburgh mill as "only a shadow." Miscellaneous business, however, shows gains over last month's volume.

Some sheetmakers are sold four to five weeks in advance on cold-rolled sheets and two to three weeks on hot-rolled. This is an improvement over a month ago.

Delivery promises on galvanized sheets extend several weeks.

An interesting trend in New Eng-

"SAVES UP TO 50% OF THE FORMER COST OF REMOVING SCALE, DIRT, RUST & PAINT!" —Say Users of MACLEOD Type "H" BLAST CLEANING MACHINE



"Blast cleaning with the modern Macleod equipment has cut my costs in half. I should have discarded my old-fashioned cleaning methods years ago"—a typical comment from a satisfied Macleod user.

Low initial cost, low-cost operation and superior blasting efficiency are the secrets for the popularity of the Macleod Type H blast cleaning machine. One of its economy features is the positive shut-off valve that stops abrasive flow without releasing the air pressure within the blast tank.

The Macleod Type "H" machine is available in two standard sizes (8.5 cu. ft., and 10 cu. ft.) or in special capacities on request. It can be furnished either as a portable or stationary machine. Macleod also offers a complete line of other blast cleaning machines, cabinets, and rooms to meet every need.

57 YEARS of SERVICE TO INDUSTRY

The MACLEOD COMPANY
33 Mosteller Road, Sharonville, Ohio
Send this coupon for MACLEOD Bulletin No. 200—BLAST CLEANING MACHINES

Name _____
Address _____
City _____ Zone _____ State _____

land is the reported increase in the use of porcelain enameled sheets in the construction field.

Steel Bars . . .

Bar Prices, Page 182

Commercial bar orders are a shade better. More orders for hot carbon bars for October shipment are appearing, notably from cold-finished converters and forge shops. But producers still offer a wide variety of sizes and shapes for first rolling. This means deliveries range from a few days to three and four weeks, depending on the rolling cycles of the separate mills. In New England substantial tonnage can be shipped from stock on sizes 2-inch and under.

A year ago cold-finished bars were ahead of their hot carbon counterparts. Today, the reverse is true. One reason for this, of course, is that defense needs are smaller. Last year at this time cold drawers had comparatively more such business on hand than hot rollers, so this year they have felt the lag in defense buying to a greater extent.

Demand for alloy bars has perked up a bit, notably in New England where screw machine product consumers are showing more interest in free cutting grades, including leaded and high resulphurized steel.

Wire . . .

Wire Prices, Pages 184 & 185

Pressure on the wire mills is not taxing production facilities. Only consumers with more extended order books for fourth quarter are buying ahead, placing tonnage for shipment beyond October.

Wire mills in New England are in position to get out tonnage well under normal lead-time on many grades. This tends to restrict forward buying.

Keystone Steel & Wire Co., Peoria, Ill., plans to increase its wire rod processing facilities, provide additional warehouse space and add to its finishing and shipping operations. An 80 x 300-ft bundling building will be constructed at the company's Bartonville, Ill., mill.

Warehouse space for agricultural and building trades products will be enlarged by addition of a 50 x 300-ft building. Still another addition, a 200 x 200-ft extension to existing buildings, will provide space for new machinery, wire processing and warehousing.

Other improvements by Keystone include installation of a soaking pit in the steel plant. Nearing completion is a building to house a 36-base gas-fired muffle furnace.

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

they all know the best place in Cleveland

"Hotel Cleveland, sir?"

Whether you arrive by plane, train or car, the friendliest place to stay is Hotel Cleveland, where airport limousines make their first stop.

No room charge for children under 14 when registered with an adult.

Hotel Cleveland

SONNABEND OPERATED HOTELS
Distinguished American Landmarks
CHICAGO: Edgewater Beach Hotel
BOSTON: Hotel Somerset
NEW YORK CITY: Ritz Tower Hotel
CLEVELAND: Hotel Cleveland

today—it's a bigger catch with MUSCLES OF STEEL

Five billion pounds of fish yearly. It's a catch that would make the oldtime Gloucester fisherman gasp—yet it's all in the day's work for America's modern fishing industry. And it's a job that couldn't be handled without the aid of *muscles of steel*—indispensable wire rope.

Whether off the Newfoundland Banks, along the Gulf Coast, or in the waters of the Pacific, powerful winch-equipped trawlers depend on Wickwire Rope to haul in their heavily laden nets.

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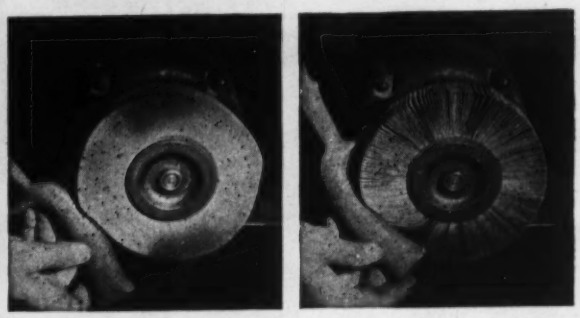

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Tubular Goods . . .

Tubular Goods Prices, Page 186

Merchant pipe producers are experiencing good business. Volumewise, so are pipe jobbers. However, due to continued price shading, resellers are not enjoying the business they would like.

Oil country goods producers' order books are reported filling for fourth quarter. Consumers, though, are not buying as far ahead as they were earlier this year.

Seamless specialty sales are fair at Pittsburgh, and mechanical tubing orders are improving. Most of the gains in the last week or so are attributed to increased automotive requirements. August sales to automakers were poor.

In the Pacific Northwest, the city of Tacoma has opened bids for a water system expansion that will require 325 tons of cast iron pipe.

Plates . . .

Plate Prices, Page 182

A spotty market situation prevails in plates. Some mills anticipate a September pickup following slow August business, which was no better than that in July. At the same time, there is some evidence of a slight pick up in demand, notably in the East. Although shipments are still available within two weeks, one eastern mill is reported booked into October on sheared plate.

There appears to be no particular spurt in demand from any consuming line. The general tendency is in the direction of balancing inventories.

An increasing share of plate business is in specialties, which, in effect, is diversifying activities of plate mills in fabricating and heat treating departments.

Close to 2500 tons will be required for 50 steam locomotives recently placed with the Baldwin-Lima-Hamilton Corp., Eddystone, Pa., by the director of Foreign Operations Administration, Washington, for shipment to India. The remaining 50 locomotives on inquiry were placed with the Japanese Rolling Stock Export Co., Tokyo, Japan. Baldwin's bid was $178,200 a locomotive, the Japanese bid $81,470.

The same agency will also place 2500 freight cars for India, splitting the order among builders in this country and foreign concerns, probably British, Belgian and Japanese.

Structural Shapes . . .

Structural Shape Prices, Page 182

Structural steel fabricators report market activity is maintaining a good pace. While volume continues substantial, what appears like a leveling off is noted at some points.

Inquiry is diversified. Bridge work continues outstanding though large projects are not coming out like they were earlier in the summer. There is a fair diversity of other types of construction current, so that over-all inquiry is well sustained. In New England, for example, both contracts and new inquiry are heavier. Competition in the area is sharp, however, and quotations usually are under engineer's estimates.

Boring contracts have been let for the Massachusetts turnpike. Initial construction estimates will be out before year's end. About 50,000 tons of structurals will be required for bridges.

Alan Wood Mill Rolls Again

Alan Wood Steel Co.'s 84-inch plate mill is operating again after being modernized.

The renovation, one of the company's major postwar projects, involved additions to buildings and the installation of new equipment costing about $3.3 million. Alan Wood is now able to increase its annual plate production about 20 per cent, says John T. Whiting, president.

One of the features of the mill is a new 55-foot rotary hearth slab heating furnace. It provides considerably more heating capacity than the six old furnaces it replaces. Built and installed by the George Hagan Co., Pittsburgh, the furnace with components, cost over $1 million.

Also included in the improvement program are new plate layout and shearing facilities, along with the latest type rotary side shear manufactured by United Engineering & Foundry Co. The new shearing facilities, with components, cost over $1 million.

Other new installations at the plate mill include a new scarfing yard, a high-pressure descaling system, new mechanical side guards at mill stands and a new four-high cold roller-leveler.

Pig Iron . . .

Pig Iron Prices, Page 188

Current mail brought a spurt in spot orders for pig iron. The aggregate was not heavy, but the gain indicated that foundries in many districts are stepping up their melting rates. Orders for castings are heavier and those shops receiving them need iron to maintain stocks.

While the outlook for September is encouraging, sellers believe business will be far from brisk. Some are still averaging less than four days a week.

In the Los Angeles district, melters have reduced work schedules from two shifts to one. Prices of No. 1 cupola cast, which have been steady there for several weeks at $44 a ton, are weaker.

Ratio of iron to scrap in melts at both gray iron and malleable shops is relatively high, notably with those supplying industrial machine parts.

American Steel Foundries, Chicago, is offering for sale its Newark, N. J., plant. If a satisfactory purchaser cannot be found by Oct. 31 to buy the property as a "going" foundry, the shop will be closed because of lack of business.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 182

Several major reinforcing bar tonnages are pending in the Pacafic Northwest area. These include 3000 tons for The Dalles dam, Seattle's Gorge dam involving 1000 tons, bids Oct. 6, and a Washington state highway project involving 550 tons.

Big Business Ahead for Alloy Steel Tubing

USE of alloy steel tubing will double in the next seven years. That's what the Tubular Products Division of the Babcock & Wilcox Co., Beaver Falls, Pa., is counting on.

By 1960, annual shipments of that product should reach 1 million tons, says Edward A. Livingstone, the division's vice president. He noted that the industry's shipments rose from 276,217 net tons in 1946 to 576,068 tons in 1953. This trend, he believes, will continue in the next decade at an even higher rate of increase. Technological advancements are constantly creating new uses.

To help it share in the increasing business, B & W's Tubular Products Division completed a four-year expansion program that more than doubles its steelmaking facilities and provides an ingot capacity of about 230,000 tons a year. The company added two electric arc furnaces. One has a 75-ton capacity and the other, 50 tons. The company now has four electrics. One three-hole battery and one four-hole battery of soaking pits were added. A 1500-ton forging press also was installed to provide additional forging capacity of 120,000 tons a year.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3000 tons, bridge superstructure, Red river, Caddo-Bossier parishes, Louisiana, to Todd Shipyards Corp., Houston, Tex.; Austin Bridge Co., Dallas, Tex., general contractor.

1300 tons, municipal library, Hartford, Conn., to Lehigh Structural Steel Co., Allentown, Pa.

620 tons, frogs, switches, castings, crane rails, etc., for Puget Sound Navy yard, Washington state, to Bethlehem Pacific Coast Steel Corp., Seattle; Butler Construction & Engineering Co., Seattle, general contractors.

325 tons, state highway bridges, Westwood-Dedham, Mass., to Tower Iron Works, Providence, R. I.; S. & M. Construction Co., Providence, general contractor.

325 tons, building, Penn Fruit Co., Philadelphia; Frank M. Weaver & Co., Lansdale, Pa.

150 tons, addition, Children's Hospital, Harrisburg, Pa., to Goetz Welding Co., that city.

100 tons, school, Sharon, Mass., to West End Iron Works, Cambridge, Mass.; J. F. Rand & Son, Boston, general contractor; 60 tons joists to Macomber Co. and 60 tons, reinforcing bars, U. S. Steel Supply Division, U. S. Steel Corp., Cambridge, Mass.

STRUCTURAL STEEL PENDING

3000 tons, The Dalles project; bids in to U. S. Engineer, Portland, Aug. 31.

1600 tons, section, Horace Harding expressway, Triborough Bridge Authority, Queens, New York, bids closed.

1545 tons, bridges, Indiana toll road; bids Sept. 15, Toll Road Commission, Indianapolis.

1070 tons, turnpike bridge, Montgomery county, Pa., bids Sept. 30.

1060 tons, Washington state Skagit river bridge; bids in at Olympia, Aug. 31.

663 tons, state highway bridge, Delaware county, Pennsylvania, bids Sept. 17; also 165 tons reinforcing bars.

600 tons, Delaware county institutional buildings, Lima, Pa., bids Sept. 21.

400 tons, senior high school, Abbington, Pa., bids Sept. 23.

240 tons, substation steel; Cramer & Dunlap, Tulsa, Okla., apparently low $95,958 to Bonneville Administration, Portland, Oreg.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1500 tons, 40 Oregon state highway projects, to various unstated Portland, Oreg., interests.

180 tons, bridge superstructure, Red river, Caddo-Bossier parishes, Louisiana, to Southwest Steel Products Co., Dallas, Tex.; Austin Bridge Co., Dallas, general contractor.

116 tons, Alaska theater, Elmendorf Field, Alaska, and addition to Scott Paper Co. plant, Everett, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle.

REINFORCING BARS PENDING

3000 tons, The Dalles dam, Columbia river; bids in Aug. 31.

1000 tons, addition to Gorge dam, Skagit river project; bids to Seattle Oct. 6.

740 tons, bridges, Indiana toll road; bids Sept. 15; Toll Road Commission, Indianapolis.

550 tons, Skagit river bridge, Washington state; bids in Aug. 31.

165 tons, state highway bridge, Delaware county, Pennsylvania, bids Sept. 17; also 663 tons structural shapes.

Unstated, ammunition storage and shop building, Paine Air Field, Washington state; Barrow & Shaffer, Everett, Wash., low $134,393 to U. S. Engineer.

PLATES . . .

PLATES PLACED

100 tons plus, Renton, Wash., water storage tank, to Hammond Iron Works, Provo, Utah, low $69,650.

30 tons, 36 inch submarine water pipe, for Anacortes, Wash., to Hydraulic Supply Mfg. Co., Seattle, low $16,784.

PLATES PENDING

100 tons, elevated water tank, Richland Water District, Portland, Oreg.; Pittsburgh-Des Moines Steel Co., Seattle, apparently low.

Unstated, 8¼ million gallon storage tank at Seattle tank farm; plans by Shell Oil Co. engineers.

Unstated, 2½ million gallon reservoir, Fort Richardson, Alaska, air base; bids to U. S. Engineer, Anchorage, Alaska, Sept. 24.

RAILS, CARS . . .

RAILROAD CARS PLACED

Bangor & Aroostook, 350 fifty-ton refrigerator cars to the Pacific Car & Foundry Co.

Columbia-Geneva Steel Division, U. S. Steel Corp., nine 90-ton gondolas to Thrall Car Mfg. Co.

Detroit & Toledo Shore Line, 100 double door box cars to the Greenville Steel Car Co., Greenville, Pa.

Louisville & Nashville, 13 passenger coaches to ACF Industries, New York.

New York, New Haven & Hartford, 85 covered hoppers, 2007-cu. ft. capacity each, to Pullman-Standard Car Mfg. Co., Chicago.

New York City Board of Transportation, 400 subway cars, to St. Louis Car Co., St. Louis.

New York, Chicago & St. Louis, 150 double door box cars, to the Greenville Steel Car Co., Greenville, Pa.

Southern Pacific, 1500 box cars to own shops.

Union Pacific, 700 freight cars, 300 automobile cars and 200 box cars going to the Pullman-Standard Car Mfg. Co., Chicago, and 200 tank cars to ACF Industries, New York.

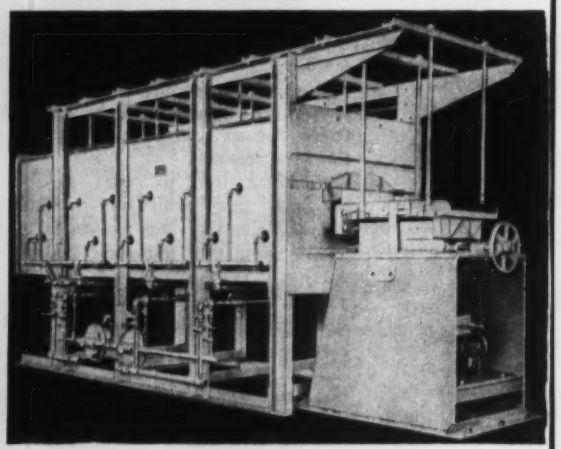
Western Pacific, forty 50-ft box cars, to Pullman-Standard Car Mfg. Co., Chicago; Western Pacific directors also authorized purchase of 100 additional 50-ft box cars, but have not selected the builder.

RAILROAD CARS PENDING

Fruit Growers Express, 300 fifty-ton refrigerator cars; construction authorized for first quarter next year.

Western Fruit Express Co., 50 seventy-ton mechanical refrigerator cars; construction authorized for first quarter next year.

SWING INTO HIGH PRODUCTION WITH AGF RECIPROCATING FURNACES



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Ores

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit deld. E. Pa.

Foundry and basic 52-62% concentrates . contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	20.00
N. African hematite (spot)	nom. 20.00-22.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, before duty

Foreign Wolframite, good commercial quality	$24.00-25.00
Domestic sheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, $1.02-1.05 per long ton unit c.i.f. U. S. ports, duty for buyer's account: 46-47%, 93c-95c.

Chrome Ore

Gross ton f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $40.00-$42.00
48% 3:1	42.00-44.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	nom. 34.00

Domestic

(Rail nearest seller)

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb, Mo content mines, unpacked	$1.00

Antimony Ore

Per unit of 8lb content, c.i.f. seaboard

50-60%	$3.80-$4.20
60-65%	4.65-4.75

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $89; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill. Stevens Pottery, Ga., Woodbridge, N. J., $109; Salina, Pa., $114; Niles, O., $120; Los Angeles, Pittsburg, Calif., $132.30

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $115; Warren, Niles, O., Hays, Pa., $120; E. Chicago, Ind., Joliet, Rockdale, Ill., $125; Cutler, Utah, $116.55; Los Angeles, $122.85.

Insulating Fire Brick

2300° *F:* Massillion, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Maxico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala. $212.80.

Ladle Brick

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Jonhstown, Merrill Station, Pa., Wellsville, O., $77.50; Mexico, Mo., $73.50; Clearfield, Pa., Portsmouth, O., $83; Perla, Ark., $109; Los Angeles, $110.25; Pittsburg, Calif., $111.30.

Sleeves

Reesdale, Pa., $139.70; Johnstown, Pa., $140; Clearfield, Pa., $148.50; St. Louis, $151.80; Athens, Tex., $155.

Nozzles

Reesdale, Pa., $223.50; Johnstown, Pa., $229.20; Clearfield, Pa., $241.40; St. Louis, $247.10; Athens, Tex., $247.70.

Runners

Reesdale, Pa., $174; Johnstown, Pa., $177.80; Clearfield, Pa., $185.50; St. Louis, $187.30; Athens, Tex., $191.80.

High-Alumina Brick

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $179; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $223.00; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $225; Danville, Ill., $258; Clearfield, Pa., $252.

Dolomite

Domestic dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Nario, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $14.60; Dolly Siding, Bonne Terre, Mo., $13.65.

Magnesite

Domestic, deadburned bulk; Luning, Nev., $38.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.50-$15.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearney, N. J., ovens	$24.00
Everett, Mass., ovens	
New England, deld.	*26.05
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Chicago, deld.	28.12
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	25.00
Buffalo, deld.	26.25
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	23.00
Swedeland, Pa., ovens	23.00
St. Louis, ovens	
St. Louis, deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, O. deld.	26.62
Detroit, ovens	25.50
Detroit, deld.	26.50
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzol	40.00
Toluol, one deg	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Sulphate of ammonia	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

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Phenol 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
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6	60	23.25
7, 8, 9, 10	60	21.00
12, 14	72	20.50
16	72	20.00
17	60	20.50
18	72	20.50
20	72	20.00

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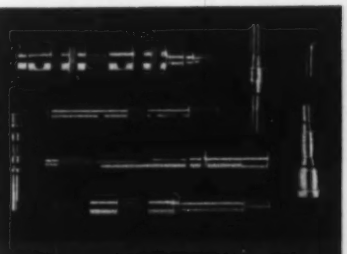
40	100	$8.95
40, 35, 30	110	8.95
30	84	9.10
24	96	8.90
24	72, 84	9.10
20	90	8.95
20	84	9.10
17	72	9.10
17	60	9.50
14	72	9.50
14, 12, 10	60	10.30
8	60	10.55



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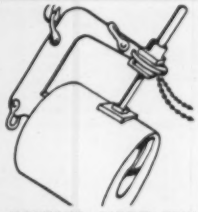

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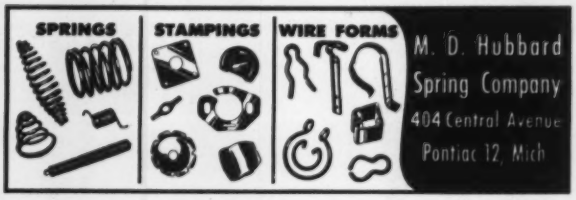

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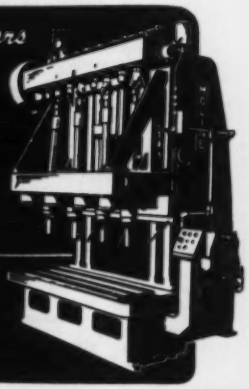

MOLINE TOOL CO.
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Start Scrap Futures Trading

Trading in the first futures market for iron and steel scrap began Sept. 7 in the Chicago Mercantile Exchange. The January contract, calling for 40 gross tons of No. 1 heavy melting scrap, opened at $31.50 per ton and was promptly bid up to $34.

First purchase of a January contract by Merrill, Lynch, Pierce, Fenner & Beane, Chicago brokers, for Ben Luria, Luria Iron & Steel Co., York, Pa. was from Gerald Hatoff, Gross Egg Co., and William Rankin, a broker usually acting for Bache & Co. The first five contracts went to Ben Luria. Price was $31.50 a unit.

First March sale was at $33.25 a unit and was made by John Coleman, a clearing member of the Exchange, to William Katz of S. K. Produce.

Total trades for the day were 35 units for January and one for March. The latter month opened at $33.25 and remained there.

Trading on the exchange is in No. 1 heavy melting steel only. No. 2 heavy melting is deliverable at a $5 per ton discount.

Scrap . . .

Scrap Prices, Page 200

New York—Brokers' buying prices for iron and steel scrap are currently unchanged. Higher prices appear likely soon as a result of continued pressure for export tonnage. Shipments of scrap abroad this month are expected to exceed those of last month, in the opinion of trade leaders.

Buffalo—Although unconfirmed, reports of No. 1 heavy melting steel selling $2 to $3 per ton higher have strengthened the market here. Dealers were encouraged by the reports and mill bidding within currently quoted ranges was ignored.

Philadelphia—While domestic scrap buying still lags, export business continues lively, with district consumers of the major open-hearth grades paying higher in competition for the relatively small tonnages they're buying.

Accordingly, on the basis of light domestic buying, No. 1 heavy melting steel and No. 1 bundles are now holding at $28.50 to $29, delivered consumer plant, No. 2 heavy melting at $26 to $27 and, No. 2 bundles at $22 to $22.50. No. 1 busheling is higher at $28.50 to $29, delivered, but this spread is purely nominal as no domestic trading is reported.

Electric furnace bundles are higher at $29, delivered, machine shop turnings $16 to $16.50, short shovel turnings $19 to $20, structurals and plate $30, and heavy turnings $25.

A cargo of 9400 tons of No. 2 bundles was scheduled to leave Philadelphia for shipment abroad last week.

Pittsburgh—A leading steelmaker in this area last week made its largest purchase of dealer scrap this year. The purchase boosted No. 1 heavy melting scrap to a range of $30 to $31. Increases of $1 a ton were registered on No. 2 heavy melting, No. 1 and No. 2 bundles and No. 1 busheling.

Cleveland—While scrap prices are unchanged at levels recently established, the market is definitely firmer. This largely reflects improved trade sentiment arising from increasing scarcity of top-grade material as automotive lists shrink in step with shutdowns for model changeovers.

Chicago — Chief grades of open-hearth scrap are holding steady. While the market isn't particularly active, there is belief that a somewhat higher steelmaking rate is ahead following the Labor Day week dip to 66 per cent of capacity.

Cincinnati — The scrap market is quiet. With limited trading, prices are unchanged.

Los Angeles—Dealers' inventories are small. With collections lagging owing to low prices and narrow profit margins, top quality steelmaking scrap is becoming scarce.

Seattle—Scrap is reasonably firm at $25 and $21 respectively for No. 1 and No. 2 heavy melting, $17 for No. 2 bundles. Demand is insufficient to raise prices but is heavy enough to absorb offerings.

Warehouse . . .

Warehouse Prices, Page 188

Volume of business booked by distributors continues to be disappointing. Sales are slightly better compared with the abnormally low volume in the early third quarter, but the sudden rush of orders that followed

(*Please turn to page* 202)

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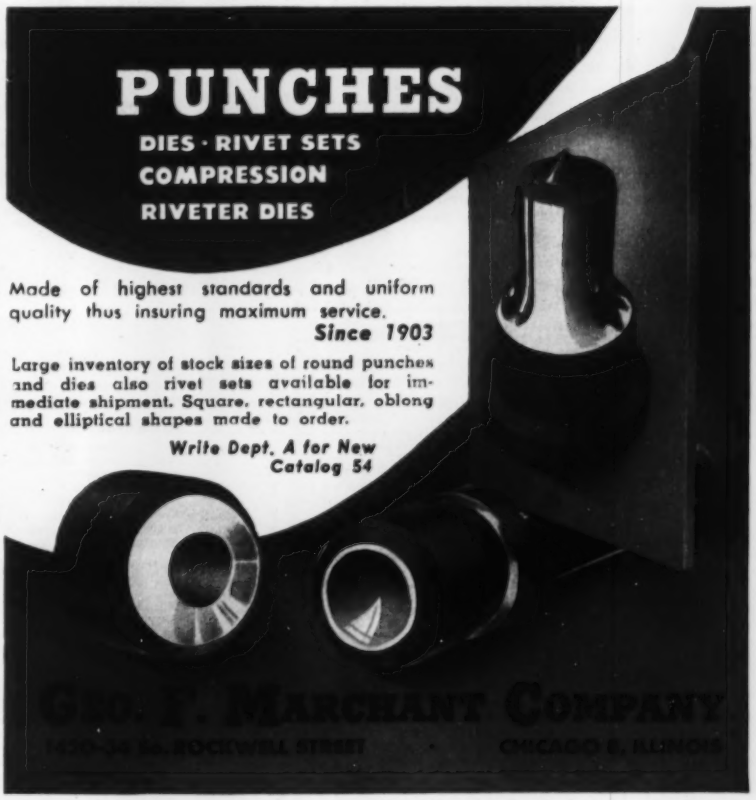
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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Sept. 8	$29.75
Sept. 1	29.00
Aug. Avg.	28.80
Sept., 1953	36.93
Sept., 1949	26.07

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	*30.00-31.00*
No. 2 heavy melting	*27.00-28.00*
No. 1 bundles	*30.00-31.00*
No. 2 bundles	*24.00-25.00*
No. 1 busheling	*29.00-30.00*
Machine shop turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Short shovel turnings	19.00-20.00
Cast iron borings	18.00-19.00
Cut structurals, 5 ft l'gths	31.00-32.00
Heavy turnings	26.00-27.00
Punchings & plate scrap	32.00-33.00
Electric furnace bundles	32.00-33.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Charging box cast	32.00-33.00
Heavy breakable cast	30.00-31.00
Unstripped motor blocks	23.00-24.00
No. 1 machinery cast	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00
Rails, 2-ft and under	43.00-44.00
Rails, 18-in. and under	44.00-45.00
Rails, random lengths	37.00-38.00
Railroad specialties	34.00-35.00

Stainless Steel Scrap

18-8 bundles & solids	180.00-195.00
18-8 turnings	85.00-90.00
430 bundles & solids	65.00-70.00
430 turnings	50.00-52.00

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	28.00-29.00
No. 2 bundles	23.00-24.00
No. 1 busheling	28.00-29.00
Machine shop turnings	12.00-13.00
Mixed borings, turnings	16.00-17.00
Short shovel turnings	16.00-17.00
Cast iron borings	16.00-17.00
Low phos.	30.00-31.00
Cut structural plate 2 ft and under	34.00-35.00
Alloy free, short shovel turnings	17.50-18.50
Electric furnace bundles	29.00-30.00

Cast Iron Grades

No. 1 cupola	41.00-42.00
Charging box cast	26.50-27.50
Stove plate	33.00-34.00
Heavy breakable cast	25.50-26.50
Unstripped motor blocks	25.00-26.00
Brake shoes	29.00-30.00
Clean auto cast	43.00-44.00
No. 1 wheels	35.00-36.00
Burnt cast	27.00-28.00
Drop broken machinery	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00
R.R. malleable	41.00-42.00
Rails, 3-ft and under	43.00-44.00
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	40.00-41.00
Cast steel	34.00-35.00
Railroad specialties	35.00-36.00
Uncut tires	36.00-37.00
Angles, splice bars	41.00-42.00
Rails, Rerolling	45.00-46.00

Stainless Steel

(F.o.b. shipping point)

18-8 bundles, solids	nom. 160.00-170.00
18-8 turnings	nom. 70.00-80.00
430 clips, bundles, solids	nom. 70.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	27.00-28.00
No. 1 bundles	32.00-33.00
No. 2 bundles	23.00-24.00
Machine shop turnings	13.00-14.00
Short shovel turnings	19.00-20.00
Cast iron borings	19.00-20.00
Low phos.	33.00-34.00
Electric furnace bundles	31.00-32.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	*28.50-29.00*
No. 2 heavy melting	*26.50-27.00*
No. 1 bundles	*28.50-29.00*
No. 2 bundles	*22.00-22.50*
No. 1 busheling	*28.50-29.00**
Electric furnace bundles	*29.00*
Machine shop turnings	*16.00-16.50*
Mixed borings, turnings	16.00
Short shovel turnings	*19.00-20.00*
Structurals & plate	*30.00*
Heavy turnings	*25.00*
Couplers, springs, wheels	32.00-33.00
Rail crops, 2 ft & under	42.00-43.00

Cast Iron Grades

No. 1 cupola	35.00-36.00
Malleable	37.00*
Heavy breakable cast	36.00-36.50
Unstripped motor blocks	nom.
Drop broken machinery	41.00-42.00

*Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	21.00-21.50
No. 2 heavy melting	18.00-19.00
No. 1 bundles	21.00-21.50
No. 2 bundles	15.50-16.50
Machine shop turnings	7.00-8.00
Mixed borings, short turnings	10.00-11.00
Low phos. (structural & plate)	24.00-25.00
Short shovel turnings	10.50-11.00

Cast Iron Grades

No. 1 cupola	29.00-30.00
Unsrripped motor blocks	19.00-20.00*

Stainless Steel

18-8 sheets, clips, solids	170.00-175.00
18-8 borings, turnings	70.00-75.00
430 sheets, clips, solids	40.00
410 sheets, clips, solids	30.00

*Nominal.

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	18.50-19-00*
No. 2 heavy melting	15.00-15.50
No. 1 bundles	18.00-19.00
No. 2 bundles	14.00-15.00
Mixed borings, turnings	8.50-9.50
Machine shop turnings	4.00-5.00
Short shovel turnings	10.00-11.00
No. 1 cast	29.00-30.00
Mixed cupola cast	27.00-28.00
No. 1 machinery cast	32.00-33.00

* $4 to $4.50 higher for export.

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	25.50-26.50
No. 2 heavy melting	22.50-23.50
No. 1 bundles	25.50-26.50
No. 2 bundles	19.00-20.00
No. 1 busheling	25.50-26.50
Machine shop turnings	11.00-12.00
Mixed borings, turnings	14.50-15.50
Short shovel turnings	14.50-15.50
Cast iron borings	14.50-15.50
Low phos. 18-in.	32.00-33.00

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	35.00
Charging box cast	36.00
Drop broken machinery	44.00

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00
Rails, 18-in. and under	43.00-44.00
Rails, random lengths	36.00-37.00

CHICAGO

No. 1 heavy melting	29.00-31.00
No. 2 heavy melting	27.00-28.00
No. 1 factory bundles	31.00-32.00
No. 1 dealer bundles	28.00-29.00
No. 2 bundles	22.00-23.00
No. 1 busheling	29.00-31.00
Machine shop turnings	14.00-15.00
Mixed borings, turnings	16.00-17.00
Short shovel turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut structurals, 3-ft	32.00-33.00
Punching & plate scrap	*33.00-34.00*
Electric furnace bundles	31.00-32.00

Cast Iron Grades

No. 1 cupola	35.00-36.00
Stove plate	29.00-30.00
Unstripped motor blocks	24.00-25.00
Clean auto cast	39.00-40.00
Drop broken machinery	39.00-40.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00
R.R. malleable	40.00-42.00
Rails, 2-ft. and under	*45.00-46.00*
Rails, 18-in. and under	*46.00-47.00*
Angles, splice bars	*38.00-39.00*
Rails, rerolling	44.00-45.00

Stainless Steel Scrap

18-8 clips & solids	130.00-140.00
18-8 turnings	60.00
430 clips & solids	40.00
430 turnings	20.00-25.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	22.50
No. 2 heavy melting	18.50
No. 1 bundles	23.50
No. 2 bundles	16.50
No. 1 busheling	21.50
Machine shop turnings	*8.00*
Mixed borings, turnings	*8.00*
Short shovel turnings	*10.00*
Punchings & plate scrap	24.00

Cast Iron Grades

No. 1 cupola	33.00
Charging box cast	27.00
Stove plate	29.00
Heavy breakable	23.00
Unstripped motor blocks	18.00
Clean auto cast	37.00
Malleable	28.00

BUFFALO

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	26.00-27.00
No. 2 bundles	20.00-21.00
No. 1 busheling	26.00-27.00
Machine shop turnings	13.00-14.00
Mixed borings, turnings	16.50-17.00
Short shovel turnings	17.50-18.00
Cast iron borings	16.50-17.00
Low phos.	28.00-28.50

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	35.00-36.00
No. 1 machinery	39.00-40.00

Railroad Scrap

Rails, random lengths	33.00-34.00
Rails, 3-ft and under	40.00-41.00
Railroad specialties	34.50-35.50

BIRMINGHAM

No. 1 heavy melting	19.50-20.50
No. 2 heavy melting	18.50-19.50
No. 1 bundles	18.00-19.00
No. 2 bundles	16.00-17.00
Cast iron borings	15.00-16.00
Short shovel turnings	16.00-17.00
Machine shop turnings	15.00-16.00
Electric furnace bundles	26.00-27.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	43.50-44.50
Stove plate	40.50-41.50
Bar crops and plate	30.50-31.50
Structural plate 2 ft.	30.50-31.50
Unstripped motor blocks	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	26.00-27.00
Rails, 18-in. and under	40.00-41.00
Rails, rerolling	39.00-40.00
Angles, splice bars	36.00-37.00
Stand. steel axles	35.00-36.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	25.50
No. 2 heavy melting	23.50
No. 1 bundles	25.50
No. 2 bundles	19.25
Machine shop turnings	14.00
Short shovel turnings	16.00

Cast Iron Grades

No. 1 cupola	37.00
Charging box cast	29.00
Heavy breakable cast	29.00
Unstripped motor blocks	29.00
Brake shoes	30.00
Clean auto cast	39.00
Stove plate	31.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.25
Rails, 18-in. and under	41.00
Rails, random lengths	39.00
Rails, rerolling	47.00
Uncut tires	32.50
Angles, splice bars	35.00

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	25.00
No. 2 heavy melting	21.00
No. 1 bundles	21.00
No. 2 bundles	*17.00*
No. 3 bundles	13.00
Machine shop turnings	11.50
Mixed borings, turnings	11.50
Short shovel turnings	11.50
Electric furnace, No. 1	32.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	34.00-35.00
Heavy breakable cast	23.00
Unstripped motor blocks	23.00
No. 1 wheels	21.00
Stove plate (f.o.b. plant)	28.00
Brake shoes	28.00

Railroad Scrap

(Delivered consumer plant)

Rails, random lengths	30.00-34.00

LOS ANGELES

No. 1 heavy melting	20.00
No. 2 heavy melting	16.00
No. 1 bundles	20.00
No. 2 bundles	16.00
Machine shop turnings	5.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	42.00-44.00

SAN FRANCISCO

No. 1 heavy melting	20.00
No. 2 heavy melting	16.00
No. 1 bundles	19.00
No. 2 bundles	16.00
No. 1 busheling	20.00
Machine shop turnings	5.00
Mixed borings, turnings	5.00
Short shovel turnings	9.00
Cast iron borings	9.00
Cut structurals	25.00
Heavy turnings	9.00
Punchings & plate scrap	25.00
Electric furnace bundles	19.00

Cast Iron Grades

No. 1 cupola	43.00-46.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	30.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	43.00

HAMILTON, ONT.

(Delivered prices)

No. 1 heavy melting	$22.00
No. 2 heavy melting	19.00
No. 1 bundles	22.00
No. 2 bundles	17.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Rails, remelting	32.00
Busheling, new factory: Prepared	20.00
Unprepared	16.00
Short steel turnings	12.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.

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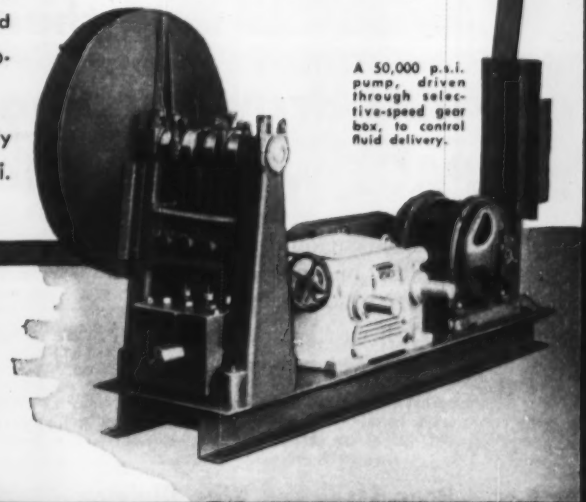

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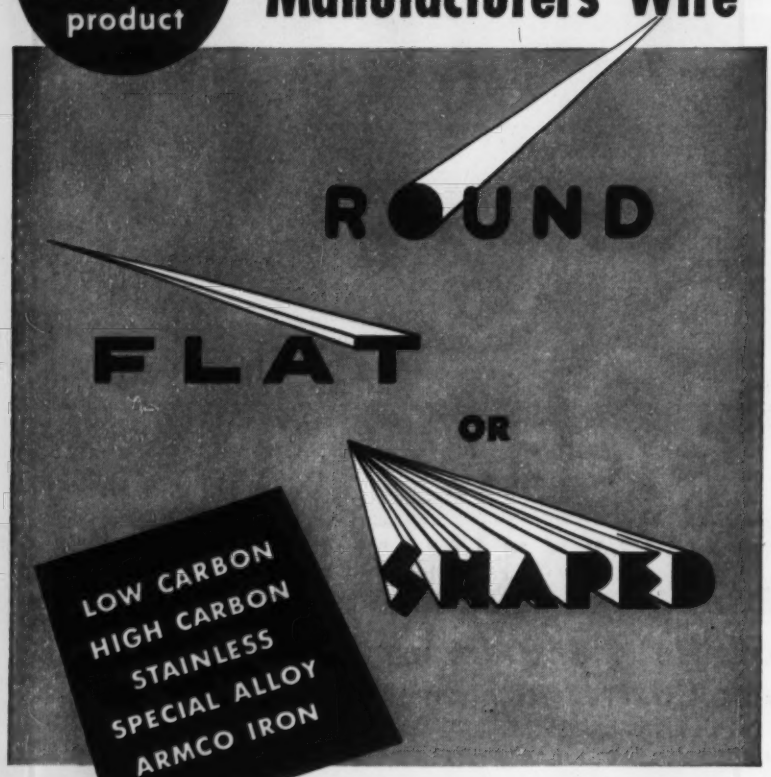

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(*Concluded from page* 199)

the reopening of plants after vacation shutdowns has leveled off.

Distributors in the smaller cities appear to be entertaining a proportionately heavier volume of business than those in larger centers.

In New England, repair work necessitated by hurricane damage boosted demand for steel products, especially galvanized sheets, galvanized wire and merchant products.

Ferroalloys . . .

Leading producers of standard ferromanganese reduced prices $10 per net ton to $190, base. This is ascribed partly to easing demand and reduction in cost of ore. Contributing to the latter is recent action by India in eliminating an export tax of 15 per cent on ore.

Also having possibly some bearing is foreign competition. European continental ferromanganese has been reported sold here at $175 per net ton, duty paid. Quantities have not been large.

Reduction in standard ferromanganese may result in an adjustment in ferromanganese briquet prices.

Ferroalloy Prices

FERROALLOY quotations remain unchanged except for standard ferromanganese which was reduced $10 per ton last week. The current price schedule was published in full on page 144 of the Sept. 6 issue of STEEL.

Oklahoma Steel Mill To Reopen

INDUSTRY in Oklahoma City, Okla., is scheduled to have a local supplier of steel mill products by the new year.

The plant formerly operated in that city by Hoster Steel Corp. has been purchased by Oklahoma City Steel Rolling Mills Inc. It expects to produce 1500 tons of steel ingots a month, plus finished steel forms.

The new company has a ten-year lease on the three-year-old plant. Equipment includes an electric arc steelmaking furnace with an annual capacity of 16,920 net tons and a rolling mill the can produce 15,000 tons of bars and light shapes each year.

The firm is capitalized at $200,000 and is headed by William R. Slinger, president, and Robert C. McGill, vice president and treasurer. Until recently, they were employed by Structural Metals Inc., Seguin, Tex.

CLASSIFIED ADVERTISING

Help Wanted

SALESMAN WANTED

Steel Salesman, selling to toy manufacturers and allied lines, to sell Industrial Paint as side line. New Jersey, New York and Pennsylvania territory. Liberal commissions and sales co-operation. Write Union Chemical Corporation, 410 Frelinghuysen Avenue, Newark 5, New Jersey.

DROP AND UPSET FORGE SUPERINTENDENT for Southwest plant with total employed 130. Must be able to supervise and direct die making, production on board and steam hammers and upsetters producing hollow forgings. Enclose photograph, full experience with references and salary brackets in past employment. Opportunity for fully qualified applicant. Reply Box 112, STEEL, Penton Building, Cleveland 13, Ohio.

Prominent Eastern special steel maker needs SALES DEVELOPMENT METALLURGIST to concentrate on high temperature alloys and related stainless steel problems. Must travel. State age, marital status, education, previous experience and salary requirements. Reply Box 113, STEEL, Penton Building, Cleveland 13, Ohio.

MACHINE SHOP SUPERVISOR

We are looking for an aggressive, alert general foreman capable of supervising a large and important production machine shop. The successful applicant must have 10-12 years of machine shop experience with at least 5 years as a foreman. An M. E. degree is preferred but not essential. Experience in directing the efficient operation of turret lathes, multiple spindle screw machine, grinders, and saws is required. Knowledge of M. T. M. and statistical quality control methods will be helpful. Age 35 to 50. Opening is in Midwest. Usual employee benefits are provided, including your moving expenses. Reply Box 116, STEEL, Penton Building, Cleveland 13, Ohio.

CHIEF ENGINEER for Eastern steel fabrication plant. Must be experienced in design, steel plate fabrication, ASME codes and complete operation of engineering department. Please give full details with salary requirements in first letter. Reply Box 118, STEEL, Penton Building, Cleveland 13, Ohio.

SALES ENGINEER

A well-established Eastern steel fabricating plant with expansion potentialities requires a manager of sales. Here is a real opportunity for a man with enterprise and proven ability. Reply with full particulars as to experience and personal data to Box 119, STEEL, Penton Building, Cleveland 13, Ohio.

Representatives Wanted

MANUFACTURERS AGENCY

Major Midwest Drop Forging Company, with complete facilities for producing up to 400 pound steel forgings, has opening for established aggressive manufacturers agency. Reply Box 111, STEEL, Penton Building, Cleveland 13, Ohio.

Positions Wanted

EXPERIENCED SALES EXECUTIVE available. Now employed as General Sales Manager. Twenty-four years' Steel experience as District Manager both Chicago and Detroit. Age 45. For full particulars write Box 117, STEEL, Penton Building, Cleveland 13, Ohio.

PLANT MANAGER

M.I.T. Engineering Graduate with Proven Record in Plant Supervision and Control of Related Functions Dealing with Production Planning, Tooling, Quality, Maintenance, and Industrial Engineering. Reply Box 100, STEEL, Penton Building, Cleveland 13, Ohio.

SALES REPRESENTATION

Established sales organization calling on the Automobile industry desires to add a line of drop forgings to their Detroit and Michigan area.

Reply Box 120, STEEL
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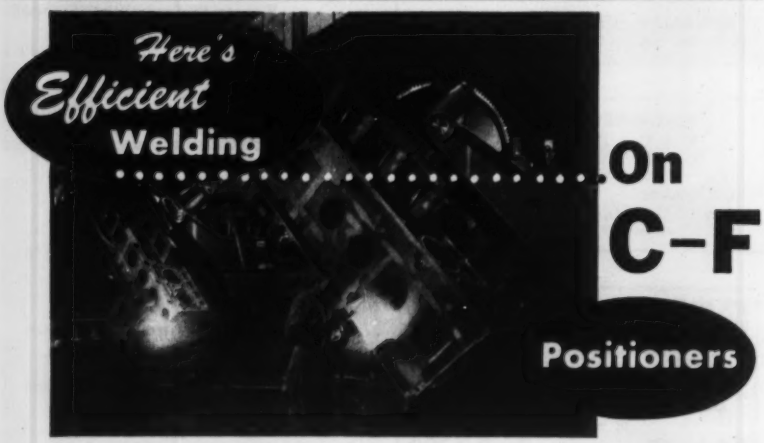

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Advertising Index

Abbey Etna Co. 36
Acme Chain Corporation 5
Aeroquip Corporation 111
Aetna-Standard Engineering Co., The ..... Inside Front Cover
Air Reduction 163
Alleghany Ludlum Steel Corporation 46
Allis-Chalmers 51, 52, 53, 54
American Brake Shoe Co., National Bearing Division 174
American Broach & Machine Co., A Division of Sundstrand Machine Tool Co. 144
American Chain & Cable, Page Steel & Wire Division 202
American Gas Furnace Co. 196
American Hot Dip Galvanizers Association, Inc. 160
American Wheelabrator & Equipment Corporation 28
American Zinc, Lead & Smelting Co. 179
American Zinc Sales Co. 179
Anti-Corrosive Metal Products Co., Inc. 205

Babcock & Wilcox Co., The, Refractories Division 137
Bay State Abrasive Products Co. 4
Bethlehem Steel Co. 1
Blanchard Machine Co., The 122
Bliss & Laughlin, Inc. 56
Bliss, E. W., Co. 39
Boston Gear Works 155
Broderick & Bascom Rope Co. 143

Cadman, A. W., Mfg. Co. 196
Carpenter Steel Co., The 50
Century Electric Co. 109
Chambersburg Engineering Co. 59
Chandler Products Corporation 27
Chicago Tramrail Corporation 170
Cincinnati Milling Machine Co., The, Process Machinery Division 81
Cincinnati Shaper Co., The 24, 25
Cities Service Oil Co. 169
Clark Controller Co., The 161, 162
Cleveland Cap Screw Co., The 44
Cleveland Crane & Engineering Co., The 104
Cleveland Hotel 192
Cleveland Steel Tool Co., The 198
Collins Engineering Co. 203
Colorado Fuel & Iron Corporation, The, Wickwire Spencer Steel Division 193
Columbia-Geneva Steel Division, United States Steel Corporation 29, 30, 31, 32
Cooper-Bessemer Corporation, The 22
Cowles Tool Co. 194
Cross Co., The 97
Crucible Steel Company of America 17
Cullen-Friestedt Co. 204

Dempster Brothers 55
Denison Engineering Co., The 33
Dixon Automatic Tool, Inc. 198
Drave Corporation, Heating Department 194
Dulien Steel Products, Inc. 203
Du Pont, E. I., de Nemours & Co., Inc. 45

Eastern Machine Screw Corporation, The 198
Eaton Manufacturing Co., Reliance Division 103
Edison, Thomas A., Inc., Edison Storage Battery Division 166
Elastic Stop Nut Corporation of America 43
Electric Equipment Co. 203
Electro Metallurgical Co., A Division of Union Carbide & Carbon Corporation 38
Enterprise Galvanizing Co. 198

Fairbanks, Morse & Co. 47
Federal Bearings Co., Inc., The 11
Federal Products Corporation 156
Ferry Cap & Set Screw Co., The 100
Florida, State of, Industrial Development Division 153

Foote Bros. Gear & Machine Corporation 26
Fort Pitt Bridge Works 102

General Electric Co. 63
Gisholt Machine Co. 15
Globe Steel Abrasive Co., The 57
Great Lakes Steel Corporation 86

Harrison Abrasive Division, Metals Disintegrating Co., Inc. 154
Heald Machine Co., The 2
Hevi Duty Electric Co. 105
Horsburgh & Scott Co., The 164
Hubbard, M. D., Spring Co. 198

Illinois Gear & Machine Co. 167
Inland Steel Co. 72
International Nickel Co., Inc., The 68
Iron & Steel Products, Inc. 203

Johnson Bronze Co. 108
Jones & Laughlin Steel Corporation 134

Kaiser Aluminum & Chemical Sales, Inc. 106, 107
Kearney & Trecker Corporation 99
Keystone Steel & Wire Co. 10
Koppers Co., Inc., Engineering & Construction Division 18, 19

La Salle Steel Co. 189
Lavallee & Ide, Inc. 93
Lincoln Electric Co., The 49
Linde Air Products Co., A Division of Union Carbide & Carbon Corporation 14, 71
Logemann Brothers Co. 201
Lord Baltimore Hotel 199

McDanel Refractory Porcelain Co. 204
McNamar Boiler & Tank Co. 203

Macleod Co., The 192
Magnethermic Corporation 157
Marchant, Geo. F., Co. 199
Master Electric Co., The Inside Back Cover
Mathews Conveyor Co. 12
Matthews, Jas. H., & Co. 198
Merit Products, Inc. 194
Mesta Machine Co. 133
Metals Disintegrating Co., Inc., Harrison Abrasive Division 154
Minneapolis-Honeywell Regulator Co., Industrial Division 206
Minnesota Mining & Mfg. Co. 181
Moline Tool Co. 198
Morey Machinery Co., Inc. 203
Morse Twist Drill & Machine Co. 34, 35

National Acme Co., The 13
National Bearing Division, American Brake Shoe Co. 174
National Steel Corporation 86
New Jersey Zinc Co. 89
Niagara Machine & Tool Works 8, 9
Norton Co. 41, 42

O'Neil-Irwin Mfg. Co. 16
Osborn Manufacturing Co., The 3
Ottawa Steel Products, Inc. 197

Page Steel & Wire Division, American Chain & Cable 202
Pittsburgh Lectromelt Furnace Corporation 58
Pittsburgh Steel Co., Thomas Strip Division 121

Reeves Pulley Co. 92
Reliance Division, Eaton Manufacturing Co. 103
Remington Rand, Inc. 7
Republic Steel Corporation, Union Drawn Steel Division 20
Revere Copper & Brass, Inc. 131
Reynolds Metals Co. 151, 152
Robbins & Myers, Inc. 37
Rockford Machine Tool Co. 62
Roebling's, John A., Sons Corporation, Subsidiary of The Colorado Fuel & Iron Corporation 40
Russell, Burdsall & Ward Bolt & Nut Co. 90
Ryerson, Joseph T., & Son, Inc. 64

Sciaky Bros., Inc. 23
Service Steel 198
Shell Oil Co. 21
Simonds Saw & Steel Co. 48
Standard Conveyor Co. 112
Stulz-Sickles Co. 6
Sundstrand Machine Tool Co., American Broach & Machine Co. Division 144
Sun Oil Co., Industrial Products Department 94
Surface Combustion Corporation 148, 149

Tennessee Coal & Iron Division, United States Steel Corporation 29, 30, 31, 32
Thomas Flexible Coupling Co. 150
Thomas Strip Division, Pittsburgh Steel Co. 121
Timken Roller Bearing Co., The Back Cover
Torrington Co., The, Swager Department 190
Torrington Manufacturing Co., The 177
Travelers Insurance Co., The 82

Udylite Corporation, The 60
Union Carbide & Carbon Corporation, Electro Metallurgical Co. 38
Union Carbide & Carbon Corporation, Linde Air Products Co. 14, 71
Union Drawn Steel Division, Republic Steel Corporation 20
United Mfg. Co. 143
United States Steel Corporation, Subsidiaries 29, 30, 31, 32, 158
United States Steel Export Co. 29, 30, 31, 32
United States Steel Supply Division, United States Steel Corporation 29, 30, 31, 32, 158

Vaughn Machinery Co., The 165
Victor Equipment Co. 173

Ward Machinery Co. 196
Ward Steel Co. 197
Washington Steel Corporation 110
Westinghouse Electric Corporation 139, 140, 141, 142
Westinghouse Electric Corporation, Sturtevant Division 67
Wheelock, Lovejoy & Co., Inc. 147
Wheland Co., The 192
Whiting Corporation 61
Wickwire Spencer Steel Division of The Colorado Fuel & Iron Corporation 193
Williams Machinery Co. 203
Wilson, Lee, Engineering Co., Inc. 146

Yale & Towne Mfg. Co., The 145

~ ~ ~

Table of Contents, Page 5

Classified Advertising, Page 203

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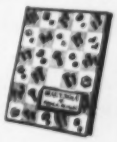

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No other bearing offers you all the advantages you get with Timken tapered roller bearings. Be sure you specify them for all the equipment you build or buy. Look for the "Timken" trade-mark on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

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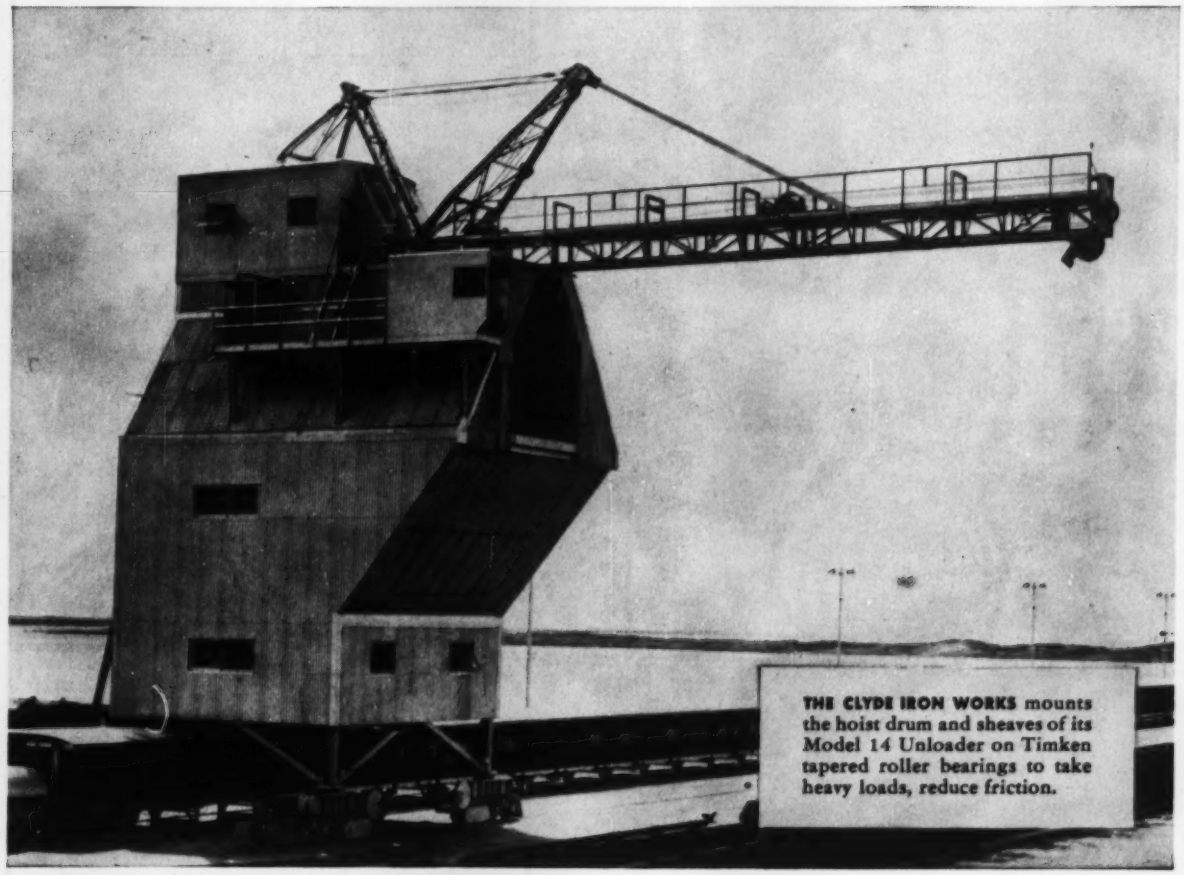

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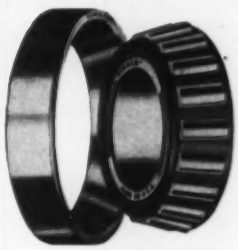

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